PEST CONTROL

APRIL 1951

EVERY MONTH SINCE 1933

Stapling treated-screen strips to ceiling is Cornell-developed fly control method described on page 20.

MAGAZINE OF THE PEST CONTROL
AND ALLIED SANITATION SERVICE INDUSTRIES

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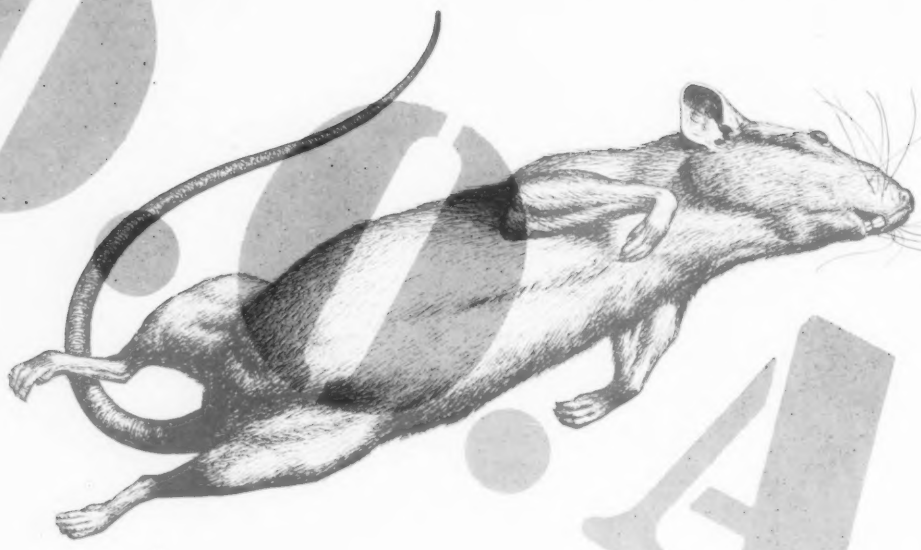

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Black Eye

Because a couple of pest control operators couldn't pass up the temptation to make an easy buck, the whole industry's reputation suffers. Elsewhere in this issue is described the story of two PCOs who collaborated with a board of education supervisor to see to it the operators allegedly were paid about $12,000, only part of which was for work actually performed.

In every line of business there is a handful of opportunists whose unscrupulous activity casts a shadow on the overwhelming majority who strive to raise the level of their chosen field. There are offenders in every segment of our economic life.

That the disease is universal, however, is no whitewash for PCOs who become infected with it. Far from it. For nearly twenty years pest control leaders have benefited from cooperation with "service" departments in our Federal government, with experiment stations, universities, and with allied industries. Today, the science of structural pest control is respected as a masterful art that takes years of skilled training and experience.

Such flagrant violations of industry ethics usually make good reading and are carried by newspapers the country over. John Public mentally associates all members of the same industry with the convicted, no matter how fine a reputation the others may have established.

PCOs everywhere can be thankful that associates guilty of such malpractice number less than one per cent.

James A. Nelson
Editor

PEST CONTROL
EVERY MONTH SINCE 1933

JAMES A. NELSON
Editor

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APRIL, 1951 Vol. 19, No. 4

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LETTERS

Gas Masks and Halide Lamps

Since the publication in our February issue of a letter by Karl Hassler commenting upon the circumstances surrounding the death of a PCO reported in Pest Control *(January '51, page 24), your editor has received a number of letters differing with the opinions expressed by Mr. Hassler. Among the comments received were letters from the National Pest Control Association and Mine Safety Appliances Co. All expressed a concern over the possibility that fumigators might get the idea from Mr. Hassler's letter that all protection equipment could be discarded if fumigators would only rely upon Halide Gas Detectors when using methyl bromide.*

To clear up any misunderstanding we quote below excerpts from "Precautions For Methyl Bromide Fumigations" prepared by the Dow Chemical Company, Midland, Michigan, and issued September 1, 1948. It is recommended that every pest control man doing any fumigation work at all should have a copy of these "Precautions". They can be obtained free of charge from Dow.

Italics in the quotations below are ours.

"A gas mask should *always* be worn during space fumigations with Methyl Bromide, during building aerations, and at any time it is necessary to enter an atmosphere that may contain the fumigant. The gas mask (including the face piece, canister and harness) should be one that is approved by the U. S. Bureau of Mines. The mask should be worn properly and used with a proper understanding of its limitations. Before entering an atmosphere containing Methyl Bromide be sure to check the mask for leaks. To do this, put on the mask with canister attached. Place hand over hole in bottom of canister and inhale. If perfectly tight, the face mask will collapse . . .

"It is recognized that much of the gas will have escaped during the period of exposure but one cannot tell how much is left at the time the building is opened without checking with a Halide Gas Detector. Evidence indicates there is frequently enough gas left to be harmful if breathed for as short a time as 30 minutes . . .

"The Halide Gas Detector should be an integral *part* of every fumigation. If used properly, it can help eliminate some of the practical hazards to the fumigator, detect excessive leaks in a building and help determine the dosage for future fumigations of that building . . .

"Two men *equipped with gas masks* and fresh canisters should work together during the aeration as well as in releasing the gas."

Wrong Metamorphosis

Reference to "Pest Control Primer," page 38, paragraph 3, in February 1951 issue of *Pest Control.*

Silverfish and lice *do* change very little at each stage from newly hatched young to adult, but are *not* said to have complete metamorphosis.

According to your discussion in the "Primer" in May 1950, page 32, they would also be grouped with the cockroaches and bed bugs under *gradual* metamorphosis.

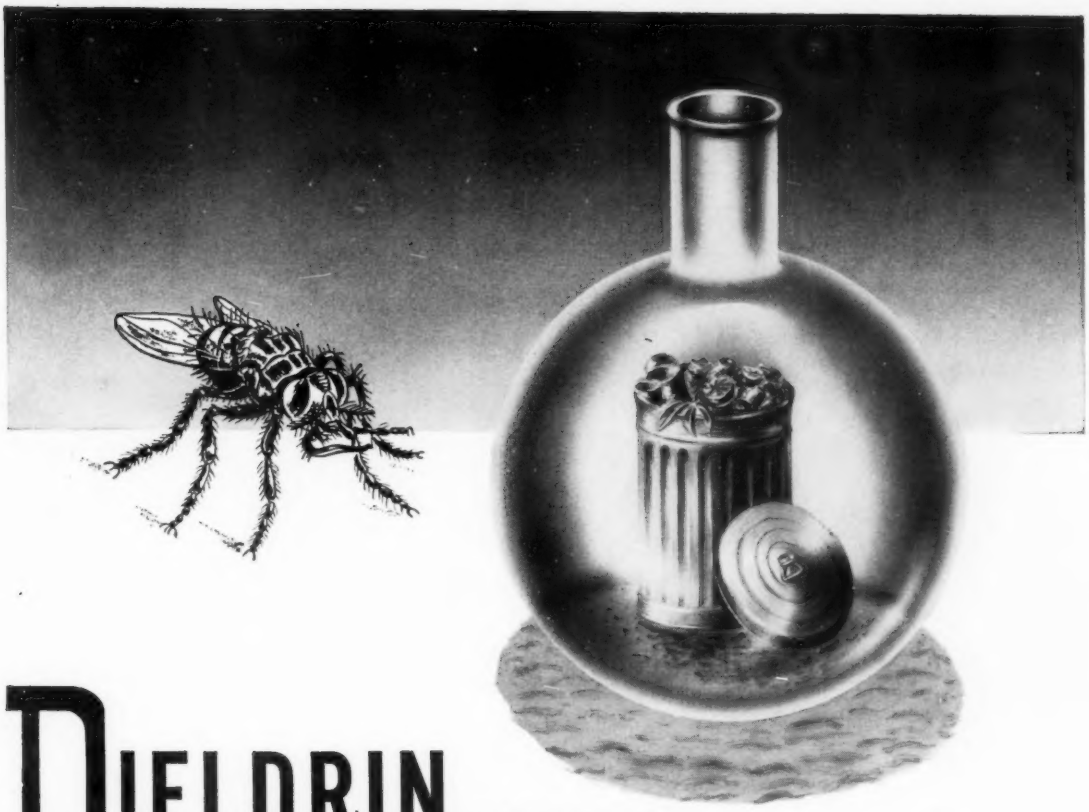
Sidney L. Suib
Structural Pest Control Co.
Olean, New York

The above belongs in our "red face" department. Reader Suib is correct. Silverfish and lice have gradual metamorphosis.

H. W. Hamilton To Head CSMA

Dr. H. W. Hamilton, H. W. Hamilton Co., New York, has been named managing director of the Chemical Specialties Mfgrs. Association.

Announcing the appointment, CSMA president Leonard J. Oppenheimer of West Disinfecting Co., said Hamilton will assume full-time duties as manager effective September 1. Dr. Hamilton, long a valued friend to the pest control industry, has served for the past eight years as Association secretary. He will continue to hold that post in addition to his new duties.



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On a California farm where fly infestation was the worst encountered, "a 0.25% Dieldrin spray kept the premises almost fly-free 6 weeks following application despite thousands of fly maggots brought in each day with garbage." The report concludes, "Results of spraying are unbelievable."

From Idaho, "Only 0.125% Dieldrin gave highest mortality of adult flies."

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*Limited quantities of Dieldrin are obtainable by professional applicators for experimental field work.

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RATS RAX, containing warfarin* (WARF Compound 42) kills by producing internal hemorrhage. It is a cumulative poison, so the chance of accidental poisoning of humans or pets is relatively minor. PCOs who have used RAX report easy, economical and safe control of rats and mice. Results from all over the country indicate that RAX is 85-90% effective in killing rats and mice.

Mobilization Committee.

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Here are Some Solutions to Insecticide-Resistant House Flies[1]

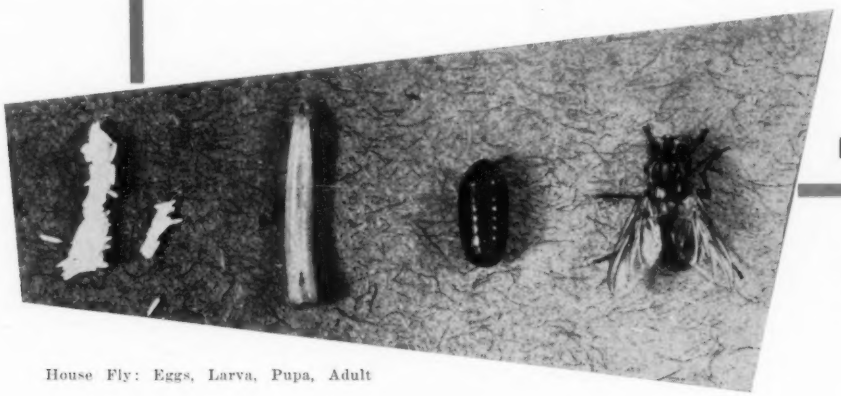
by

Dr. W. N. Bruce

and

Dr. George C. Decker

Assistant Entomologist, and Entomologist and Head, Section of Economic Entomology, Illinois Natural History Survey and Ill. Agr. Experiment Station, respectively.



House Fly: Eggs, Larva, Pupa, Adult

THE FIRST recognized occurrence of DDT-resistant flies was reported in 1947 by Giuseppe Sacca and A. Misseroli of Italy. Perhaps Italy was a logical place for the first DDT-resistant flies to develop, since the first widespread use of DDT was made by American occupation forces in Italy. In 1948 an alarming amount of DDT resistance was found among flies infesting California and scattered locations through southern, eastern, and central United States. By the end of the 1949 growing season, resistance to DDT had developed among flies in most portions of the country. A survey conducted in 1949 by the Illinois Natural History Survey showed that 87.2% of the farms in Illinois were infested with DDT-resistant flies and in the 1950 survey all wild fly populations were resistant to DDT and about 8% were resistant to lindane, dieldrin, and chlordane. The actual rate in development of DDT-resistant strains on two Illinois farms from 1945 to 1950 is shown in Table 1. The 1950 levels of DDT resistance for these two farms are significantly higher than the 1948 or 1949 levels, even though DDT applications were not made during the 1949 and 1950 seasons. This same phenomenon was found by investigators in California after lindane or dieldrin had been used for fly control.

Resistance to Other Kinds of Insecticides

Research results reported by the authors in December, 1949, revealed the development of strains of flies resistant to many of the new insecticides such as dieldrin, chlordane, lindane, toxaphene, methoxychlor, Pyrenone, para-oxon, and even to a mixture of the chlorinated hydrocarbons. This was accomplished by contaminating the larval media and treating the adult stock cages with near-lethal dosages of the insecticide. Since that report, all of the resistant laboratory strains except the para-oxon and Pyrenone strains have reached a very high level of resistance, or have risen as high as is selectively possible by the method used. A strain which showed a three-fold increase in tolerance for dieldrin in November, 1949, had risen to 2,000-fold by July, 1950. These rates of acquisition and the magnitudes of insecticide tolerance are best shown in Table 2. In any event, the dosages needed to kill individuals of these strains far exceed those which could be used in the control of field populations of house flies.

Laboratory studies also revealed that DDT or methoxychlor-resistant strains rapidly take on resistance to other related or non-related chlorinated compounds. DDT-resistant house flies developed a high degree of resistance to lindane in one-half to one-third the number of generations that were required to develop the same degree of resistance from a susceptible strain of house flies, (Table 2).

The above laboratory studies forecast quite accurately events to be followed in the field, as will be seen later in the discussion. The fact that a fly strain resistant to one insecticide has a small amount of resistance to other insecticides may explain the rapid build-up of resistance to other insecticides by the DDT-resistant flies. In all probability DDT-resistant strains possess selected genetical characters associated with the development of resistance to the other chlorinated insecticides not found in susceptible strains.

Field strains of DDT-resistant flies have acquired resistance to the newer chemicals (chlordane, dieldrin, and lindane) used for fly control in place of DDT. These field strains acquired this resistance to the new insecticides much faster than they had initially acquired resistance to DDT.

In Illinois such an added resistance occurred after two seasons of application of lindane or dieldrin while in some parts of the United States the resistance was evident the first season that lindane, dieldrin, or chlordane was used. In studying this added dieldrin and

1. This investigation was supported (in part) by a research grant from the National Institutes of Health, Public Health Service. (R.G. No. 2623).

lindane resistance acquired by field strains, investigators in California and Illinois noted that the levels of DDT resistance also had increased, apparently by the selective action of lindane or dieldrin.

Specificity of Tolerance

Although flies can be developed that are resistant to a specific insecticide, there are, associated with their development, changes that make the strains moderately resistant to other insecticides related chemically or by mode of action. In addition to this there seems to be a small amount of tolerance acquired for unrelated compounds. An examination of Table 2 will show the magnitudes of these conferred tolerances and the degrees of specificity.

Genetical Implications

The enormous magnitudes of resistance to toxicants acquired by house fly populations, Table 2, preclude the possibility of any important individual adaptation, but rather indicate a real change in the genetic make-up of the insecticide - resistant populations. There is little reason to believe that DDT-resistant strains of different origins are genetically identical.

Known attempts to solve the problem of the genetics of resistance have not been fruitless. The attempts made to date show that the DDT-resistant characters are carried by both sexes and that crosses produce what would be called physiological blends. In other words, the first hybrid generation possesses an intermediate degree of resistance. From the standpoint of genetics, there is little hope of eliminating resistance by crossing resistant flies with susceptible. The resistant flies, although well adapted to a DDT environment, may not be well adapted to a DDT-free environment. Along with the advantageous mutation occurring in resistant stock, there were probably many disadvantageous mutations which may be reflected in their reproduction capacity. If so, then one can expect a gradual loss of resistance to insecticides among field populations of house flies, as the susceptible flies literally outproduce the resistant flies. If the flies in the field lose their resistance to insecticides, when treatments have been discontinued and residues on walls and in the soil disappear, then the chlorinated hydrocarbons will again become useful as chemicals to reduce fly populations.

Mechanics of Resistance

There are several changes that might make field strains of house flies increasingly more difficult to control: the permeability of the body-wall might change, there may be an increase in the rate of detoxification, the insect might be repelled by the toxicant, there is a possibility that selection might produce flies with protective habits of resting in places not ordinarily treated, and there may be morphological changes.

Some of these changes have been demonstrated. James Sternburg, of the University of Illinois, found that our DDT I strain of flies decomposed DDT as quickly as it entered the body to produce a non-toxic DDE (2,2-bis(p-chlorophenyl) - 1,1-dichloroethylene), whereas susceptible strains did not. Some strains studied will degrade part of the DDT that enters the body. DDT-resistant flies from the Orlando laboratories were found to be significantly larger than certain strains of susceptible flies. Field observers have noticed changes in resting-site habits of some resistant flies. These flies rested on floors, lower portions of buildings, but not on the treated ceiling and walls. Some field strains of house flies are paralyzed by DDT more rapidly than are susceptible laboratory strains, but they completely recover from the initial paralysis of DDT poisoning. The quick paralysis and complete recovery serves as a protective mechanism in the field by preventing flies from resting on walls or ceilings long enough to accumulate a lethal dose of poison.

At the present time resistance to chlorinated hydrocarbons seems to be most closely correlated with the fly's ability to chemically degrade the poison to a non-toxic chemical. The site of the degradation appears to be in the hypodermal layer of the body wall of the insect. The actual mechanics of the process is not known.

Table 1. — LD-50 value of DDT on two field strains of flies expressed in micrograms per fly.

	Farm A		Farm B	
Year	Treatment on farm	LD-50	Treatment on farm	LD-50
1945	DDT	0.2	DDT	0.18
1946	DDT	0.3	DDT	0.4
1947	DDT	0.8	DDT	0.7
1948	DDT	8.1	DDT	9.0
1949	Dieldrin[1]	4.0	Lindane[2]	8.5
1950	Dieldrin[3]	18.0	Lindane[4]	42.0

1. Barns completely insulated and old DDT covered.
2. Much DDT still adhering to the walls, etc.
3. Flies acquired a ten-fold tolerance for dieldrin.
4. Flies acquired a five-fold tolerance for lindane.

What Is the Solution to the Problem of House Fly Resistance to Insecticides?

If there were an easy solution there would be no problem. Since a solution is needed, the following items of discussion may serve a useful purpose.

1. The usefulness of DDT and other chlorinated hydrocarbons is coming to an end in the control of house flies unless chemicals can be found which will prevent the flies from chemically degrading them. 1, 1 - bis - (p-chlorophenyl) ethanol will increase the effectiveness of DDT ten-fold on DDT-resistant house flies. It remains to be seen whether or not flies will become resistant to a combination of toxicant and activator.

2. New insecticides need to be developed which are not related to the chlorinated hydrocarbons. Some of the new organic phosphates may prove useful in controlling resistant house flies now found in the field. *Dilan*, a new

Table 2.--Twenty-four hour LD-50s for several insecticides (in micrograms per fly) when applied topically to the several resistant strains of house flies developed in the laboratory.

Strains	Exposure[1] Generations	Exposure[1] Insecticide	Origin of strain	Insecticide: DDT	Methoxychlor	Lindane	Toxaphene	Chlordane	Dieldrin	Pyrenone[2]	Paraoxon	Dilan
Lab. I			N.A.I.D.M.	0.33	0.99	0.03	0.69	0.12	0.019	1.13	0.045	2.40
Lab. II			Field	0.31	1.00	0.04	0.67	0.06	0.011	1.10	0.04	—
Lab. III			1951 CSMA	0.25	1.20	0.03	0.64	0.09	0.013	1.15	0.05	2.40
Pyro I	30	Pyrenone	Lab.	0.68	1.10	0.16	2.40	0.32	0.026	23.20	0.07	4.20
Para-oxon		Para-oxon	Lab.	0.45	1.00	0.05	0.90	0.15	0.02	1.22	>0.51	2.46
DDT I	18	DDT	Lab. I	260.50	14.40	0.11	0.98	0.24	0.048	1.77	0.07	2.50
DDT W	-	-	Field	10.10	1.80	0.03	0.66	0.10	0.015	1.17	—	—
DDT III	-	-	Field	26.10	8.20	0.04	0.76	0.09	0.016	1.16	—	—
DDT IV	9	DDT	N.A.I.D.M.	195.00	8.70	0.04	0.85	0.29	0.04	1.30	0.05	2.60
DDT V	-	-	Field	6.40	3.66	0.06	1.30	0.20	0.36	1.15	0.05	2.50
Methoxychlor	12	Methoxychlor	Lab. I	0.30	183.60	0.07	0.96	0.25	0.010	1.60	0.05	2.30
-M-	25	-	Methoxychlor I	0.40	155.60	0.06	0.90	0.20	0.01	1.21	0.06	2.80
Lindane	46	Lindane	Lab. I	1.20	1.10	12.70	4.80	1.86	0.40	1.40	0.05	2.91
Dieldrin	36	Dieldrin	Lab. I	2.50	3.90	0.60	12.80	101.00	390.00	1.90	0.07	2.60
Chlordane I	40	Chlordane	N.A.I.D.M.	0.72	1.50	0.65	5.70	150.20	7.25	1.22	0.07	2.50
Toxaphene I	45	Toxaphene	N.A.I.D.M.	4.50	4.90	3.75	178.00	9.10	30.00	1.20	0.06	2.60
Multi I	4	Methoxychlor	DDT I	298.00	220.00	0.12	0.71	0.23	0.08	1.80	0.07	2.54
Multi II	21	Dieldrin	Methoxychlor	2.26	280.00	0.64	16.70	31.20	240.60	1.30	0.05	2.70
Multi III	26	Mixture[3]	Methoxychlor	210.00	291.00	55.60	64.40	181.00	360.00	1.51	0.06	2.90
Multi IV	15	Dieldrin	Multi I	286.00	222.00	0.75	20.10	45.10	295.00	1.30	0.07	2.80
Multi V	16	Dieldrin	DDT I	295.00	97.50	0.37	12.80	5.70	140.00	1.25	0.06	2.80
Multi VI	19	Lindane	Methoxychlor	0.80	>100.00	40.60	4.90	2.70	0.70	1.40	0.06	2.75
Multi VII	17	Lindane	DDT I	275.00	16.70	48.30	5.10	0.96	0.60	1.50	0.09	2.95
Multi VIII	18	Lindane	Multi I	315.00	296.60	251.00	6.40	3.70	1.60	1.20	0.06	3.00
Multi IX	19	Mixture[3]	Multi I	325.00	225.00	148.40	197.10	131.30	378.90	2.00	0.07	2.25
Multi X	5	Dilan	Multi IX	322.00	205.6	162.10	165.70	140.00	380.70	2.10	0.08	222.10

1/ Generations exposure of adults and larvae to the insecticide to reach a maximum level of resistance.

2/ 10:1 mixture of piperonyl-butoxide and pyrethrins.

3/ A mixture of chlordane, lindane, dieldrin, toxaphene, DDT, and methoxychlor.

nitro-paraffin derivative of 1,1-bis (p-chlorophenyl) has shown some promise in field and laboratory tests. However, the usefulness of *Dilan* may be short lived, since *Dilan*-resistant flies have been developed from a multi-resistant strain in five generations, see Table 2. A new material, not related to the chlorinated hydrocarbons, known as G-22008 kills the now-known strains of resistant flies.

3. Some investigators are of the opinion that field strains will revert to susceptibility in the absence of residual treatments. Some DDT-resistant strains retained in the laboratory in the absence of DDT maintained their high levels of resistance for at least thirty generations. On the other hand, some investigators have reported instances of reversion of DDT-resistant flies to susceptibility in less than ten generations. Field strains tested by workers in California and Illinois, and by U. S. Public Health Service investigators, showed no loss of DDT resistance two years after DDT was discontinued as a residual treatment for fly control.

STABLE FLIES

at the *Seashore*

by Elton J. Hansens

Associate Research Specialist in Entomology New Jersey Agricultural Experiment Station, Rutgers University

Enlarged Stable Fly showing its proboscis

FLIES which commonly bite before a rain are not houseflies as is commonly said, but are stable flies. Houseflies have sucking mouthparts with a large fleshy lobe at the tip which is used for lapping up liquid foods. The stable fly, on the other hand, has a beak which can pierce skin. They are vicious biters and most annoying to man and beast. If one will look close, the beak can be seen when the fly is at rest projecting like a bayonet in front of the head.

Stable flies or *Stomoxys calcitrans* are also known in New Jersey as the beach fly or dog fly — beach flies because they are found in large numbers in seashore areas and dog flies because they annoy dogs and are most abundant in the dog days.

About five years ago a project was started at the New Jersey Agricultural Experiment Station to study these flies at the seashore and develop methods of controlling them. First it was necessary to learn something about the habits of the flies, and after sufficient facts were known, studies of control measures were started.

Briefly the problem is one of controlling breeding of the fly in decaying vegetation. Large amounts of seaweed are washed up on the bay shore of the sand spit and when fermentation takes place an excellent place for development of maggots of the flies results. As many as 600 flies have been obtained from a bushel of heavily infested seaweed. In 1948 an average of 370 flies per bushel emerged from several hundred bushels of weed in one resort town.

Thousands of bathers often head for home within fifteen minutes after stable flies move onto the beaches. Luckily flies are not always on the beaches but are found there only when there is a breeze blowing from the land and never when there is an offshore breeze. They may remain for days in sheltered places in the dunes and shrubbery and then within fifteen minutes after a land breeze starts blowing move to the beaches in large numbers. With a change in wind they disappear just as abruptly but seldom are there any bathers left on the beaches to note this fact.

The worst fly days that have been suffered through were on September 3 and 4, 1947, when countless numbers of flies appeared on the beach at Island Beach. Every bit of driftwood, every post, and every blade of grass was literally covered with flies. To get an idea of the numbers of flies, one square foot cards covered with sticky material were set up on the beach. One of these cards caught more than 600 flies in about an hour and it was estimated that only about 10% of the flies that came to the card were caught.

The erratic habits of the flies make control of adults difficult. Also they are not as easily killed

Spraying deposits of seaweed along the bay shore at Seaside Park, New Jersey

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with DDT as are some other flies. Likewise the maggots are not easy to reach with insecticides. They bury themselves in the vegetation as soon as they hatch from the eggs which the female has laid in a favorable place and when uncovered quickly move out of sight. Maggots are difficult to find even if they are known to be in an area.

DDT Does The Trick

It has been found, however, that as the flies emerge as adults they are susceptible to DDT and are quite easily killed. In cage tests in 1948 it was found that when they emerged from weed as adults more than 90% of the flies were killed by a single spray of DDT at a low concentration applied to the vegetation containing maggots and pupae of the stable fly. Flies may also be killed when they come to treated weed to lay eggs. These successful tests led to the organization of a control campaign in 1949.

Seaside Park was selected because a number of the previous studies had been made in this community and because of the interest of the governing body in a control campaign. In the summer of 1949 applications of insecticides were made to all of the decaying vegetation cast up on the bay shore at intervals of two weeks. Half of the area was treated with 0.5% DDT and the other half with 0.5% methoxychlor, using about 1 gallon of spray on 100 square feet of surface. This experimental program was highly successful, reducing flies an estimated 90%. A similar control program is being followed at Seaside Park this year.

Other control measures can also be used. In a portion of the area vegetation has been removed and used as a base for roads. When weed is collected soon after it accumulates on the shore fly breeding does not result, providing the weed is covered with soil or gravel promptly. However, removal and burying of all weed deposits would be expensive and difficult and insecticides are more economical.

If studies during the remainder of the season continue to show results, the success of these studies may lead other seashore communities to adopt a similar program for control of stable fly. Meanwhile research workers are beginning studies of other biting fly problems and in particular to investigations on greenheads — another well known and most annoying pest at the New Jersey seashore.

Clarkson ARA Defense Assistant

Dr. M. R. Clarkson of U. S. Department of Agriculture's Bureau of Animal Industry, is new Special Assistant for Defense in the Agricultural Research Administration.

Dr. Clarkson's appointment, effective March 26, fills the vacancy caused by the recent death of Dr. S. A. Rowher.

Dr. Hunt To Retire

Dr. George M. Hunt, director of U. S. Forest Products Laboratory in Madison, Wisconsin, since 1946, announced his retirement from that post March 31.

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2. **Buffalo Gnat**—Very small with big, round eyes, humped back, and short, piercing-sucking mouth parts. Wings are broad and without hairs or scales. Females are blood-suckers, attacking birds, mammals, and man.

3. **Fruit Fly**—Very small with large, wide head and large, irridescent greenish eyes. Legs and body are hairy and wings are variable in shape. Blueberries, cherries, and apples are damaged by various species.

4. **Silverfish**—small, wingless, with 3 long bristles at end of body and very long, many-segmented antennae. Body usually covered with small, silvery scales. They love dark crevices and are usually seen at night.

5. **Angoumois Grain Moth** — important stored-grain pest. Small, usually dull-colored with narrow fore wings. Females lay an average of 40 eggs, which hatch into larvae that bore into grain kernels and feed on contents.

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American Mosquito Control Assn. Invites PCO Membership

THE AMERICAN Mosquito Control Association's membership committee, in a report presented during the organization's March convention in Chicago, expressed the belief that pest control operators performing some types of services would find it advantageous to belong to their association.

The suggestion was prompted by accounts, presented by various speakers, of community-wide fly and mosquito extermination drives conducted in their cities. Reports of such projects were received from Minnesota, Wyoming and other states, in which it was evident that local PCOs had rendered valuable advisory service and assistance in putting the drives over. By joining the national association, the membership report suggested, operators would have access to latest technical data on materials and methods for mosquito and fly control and would be placed in touch with projects in which they could cooperate to their benefit.

Military Can Use PCOs

The Chicago convention also brought out that the nation's armed services can make good use of PCOs whose training and experience could be utilized in sanitation control around army and navy installations and with troops in the battle theatres.

Sanitation teams in the medical corps, as explained in a paper by Lt. Col. F. W. Whittmore of the Surgeon General's Office, Washington, D. C., are responsible for protecting the health of the troops and have to act fast at the first sign of disease. Entomologists, he said, are needed to watch for insect carriers of disease and determine which control methods are best to apply in the infinitely varied situations encountered in field operations around the world.

At present, he said, about 10 per cent of the Army's entomologists possess a Ph.D. degree; another 15 to 25 per cent have a Master's degree, and from 60 to 75 per cent have the B.S. degree from some collegiate institution. The army medical service, he said, offers an extensive career for entomologists and he continued with an explanation of "where you may fit in."

Navy research and control work against insects was also explained by Lt. Cdr. John M. Hirst of the U. S. Navy. Eighteen trainees had just finished their course at the Jacksonville, Fla., naval station, he said, and had immediately started out to naval posts around the world.

Dr. Bishopp On Investigations

Of importance to PCOs was a resolution adopted by the Mosquito Control Association, which urged that "No steps be taken which will interfere with the development, production and safe use of pesticides, so necessary to the defense effort." This action had reference to proposed federal legislation now being considered by the Delaney committee of the House of Representatives which, if enacted, would make drastic changes in regulations affecting use of insecticides.

Insect control, the resolution's preamble points out, "is vital to protection of the health and welfare of the people and certain national legislation is being considered that may greatly affect the availability of pesticides for combatting disease-carrying insects and destroyers of food and fiber." Full consideration should therefore be given to the great good done through use of insecticides, the resolution maintained.

In a similar vein, a second resolution urged Washington authorities concerned with allocation of chemicals and containers for manufacture and distribution of insecticides "to see that adequate supplies are made available."

The Delaney committee's tentatively proposed new statute was inferrentially brought before the Mosquito Control Association's Chicago convention by Dr. F. C. Bishopp, assistant chief, USDA Bureau of Entomology and Plant Quarantine, in his discussion of "Insecticide Hazards—Facts and Fallacies."

Asking the question "Is there need for more legislation?" Dr. Bishopp expressed his belief that existing federal laws are adequate to control most situations which have unjustly created public alarm.

More effective control of custom applicators of insecticides from the air is needed, he said, but this, he thought, could best be handled through state statutes. In the interest of safety, he also declared, label laws should be enacted in states where they are now lacking.

The most urgent need at the moment, Dr. Bishopp insisted, is not more laws but more publicity on the benefits which insecticides bring to society's health and economic welfare. The movement to restrict use of insecticides, he said, has arisen from isolated instances where they have been carelessly or improperly used by inexperienced persons.

He recommended a vigorous educational program to offset misinformation regarding use of chemicals for pest control and to establish in a true light the soundness of their benefits to the public.

Dr. Don M. Rees, professor of zoology at the University of Utah, Salt Lake City, was elected president of the Mosquito Control Association for 1951. For vice president Dr. Cecil R. Twinn, of the Canadian Dept. of Agriculture, Ottawa, was chosen and for treasurer R. E. Dorer, state director of malaria control, Norfolk, Va., was selected, while Thomas D. Mulhern, state dept. of public health, Fresno, Calif., was continued as executive secretary.

Manufacturers who exhibited supplies and equipment at the Drake Hotel meeting were as follows: Velsicol Corp., Chicago; Chemical Insecticide Corp., New York; H. D. Hudson Co., Chicago; Fog, Inc., Chicago, representing Todd Shipbuilding Corp.; Lawrence Aero-Mist Corp., Greenfield, Mass.; Kenny Machinery Corp., Indianapolis, Ind.; B. & G. Co., Philadelphia; Haberman Industries, Hastings, Nebr.

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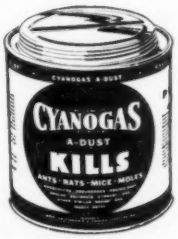

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The Status of DIELDRIN for Fly Control in 1951

As presented at the December 1950 Chemical Specialties Manufacturers Association meeting.

by DR. C. C. COMPTON

Julius Hyman & Co., Denver, Colorado

BEFORE attempting to discuss the status of Dieldrin as it relates to fly control in 1951, I would like to discuss the past performance of this product as determined in an extensive testing program during the seasons of 1949 and 1950.

During those two seasons, approximately twenty thousand pounds of technical Dieldrin was utilized in the evaluation program. Most of the Dieldrin was used by the United States Public Health Service as a formulation consisting of xylene as a solvent, various percentages of rosin as sticker, and a small percentage of emulsifier; this was applied as a water emulsion containing .625% by weight of actual Dieldrin. A small percentage was used as a 1.25% emulsion, and a smaller quantity was used as a crude suspension of a xylene-rosin-Dieldrin solution in water.

Dieldrin was also used by experimenters in approximately twenty-five states and in several foreign countries as a spray containing 25% wettable powder or as a two-pound-per-gallon emulsifiable concentrate, diluted by adding eight pounds of the wettable powder or one gallon of the emulsifiable concentrate to one hundred gallons of water, the formulation being applied to the point of run-off.

By far the greatest quantity of Dieldrin was used for treatment of out-door areas. This included residual treatments of all sorts of fly breeding areas and all manner of fly-resting surfaces including fences, privies, vegetation, animal shelters, and exterior portions of houses, barns and other out-buildings. It should be mentioned, too, that the primary interest of the United States Public Health Service in Dieldrin was for area-wide fly control while the research done by most of the other workers was for control of flies in relatively isolated areas within larger fly breeding areas.

Are Flies Dieldrin Resistant?

It might be pointed out that Dieldrin is not a rapid-acting material but is known to be highly effective and at the present time is reported to be the most outstanding of all chemicals tested for fly control, particularly from the standpoint of residual effect.

In two isolated cases in 1949 and in several cases in 1950, it was demonstrated that flies already resistant to DDT, chlordane, and lindane, followed the established pattern of resistance development and in at least four areas have now developed a high degree of resistance to Dieldrin. The areas are isolated poultry ranches in Southern California, the Phoenix, Arizona area, and isolated areas where Dieldrin has been used in the State of Georgia. A considerable amount of laboratory investigation has been done and is continuing on this subject at the following places: The Riverside Experiment Station, University of California at Riverside; The Technical Development Division of the Communicable Disease Center, United States Public Health Service at Savannah, Georgia; the Illinois State Natural History Survey, Economic Entomology Section, Urbana, Illinois; and the Julius Hyman and Company Laboratories at Denver. In view of this situation, it appears evident that the life of Dieldrin as a fly control chemical is probably limited due to the fact that in almost every area where Dieldrin is used, flies are already known to be resistant to DDT, chlordane, and lindane.

Toxicity

Before proceeding to a discussion of Dieldrin's position in 1951, I would like to mention, briefly, the toxicological experiences in handling Dieldrin for fly control, as they have developed to date. It should be pointed out that all personnel were cautioned about the possible hazards of Dieldrin prior to its distribution for fly control work and, as a result, there have been no reported cases of human poisoning among spray crews or other applicators working with this product during the season of 1949 and 1950. There have been some cases of damage to poultry in areas sprayed in such a way that puddles accumulated, or drying maggots occurred, in the range of young poultry, particularly chickens. It should also be emphasized that most of the Dieldrin was used in outdoor situations for fly control and a minimum quantity was used for the treatment of interior situations. An interesting development of the latter sort, however, was made by the Research Entomologists of the Department of Entomology and Limnology at Cornell University, and it is believed that a safe method of utilizing the residual properties of Dieldrin for fly control indoors has been worked out. Briefly, this consists of stringing at two-foot intervals along the ceiling of the barn or room, a Dieldrin - coated, three - quarter-inch, screen wire strip.

With this as background information, it would now appear that the following statements can be made with a considerable degree of certainty regarding the status of Dieldrin formulations in fly control for the 1951 season.

Availability

FIRST, Dieldrin will be in commercial production in 1951 and although an acute shortage of the product is anticipated, in view of its having been recommended in some of the major cotton producing states for the control of certain cotton insects, the

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manufacturers and formulators of the product feel that it is important to encourage a diversified market for the material and, hence, suitable quantities will be made available for fly control activities in the 1951 season.

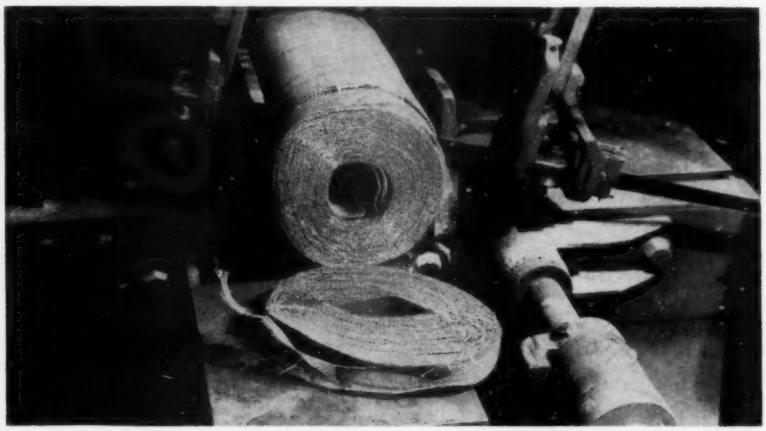
Second, the United States Public Health Service has gone on record as recommending or encouraging the use of Dieldrin for the control of flies in outdoor situations on an area-wide basis by city, state and federal agencies, provided that the recommended precautions as outlined by the Public Health Service are followed, and that spray crews using this material do so under adequate supervision.

Third, in view of the attitude of the United States Public Health Service, based upon their 1949 and 1950 experience, it is felt by the manufacturers that custom applicators, including trained pest control operators, should have Dieldrin formulations available for outdoor fly control activities in 1951. It is not certain whether the product for this use will be available as a registered product or whether the material will have to be sold under the experimental label. In other words, the label status of Dieldrin for this type of sale is still unsettled at this time.

Fourth, it seems certain that Dieldrin in small packages for over-the-counter sales will *not* be available in 1951.

Fifth, in view of the recent development at Cornell University and in view of the high degree of success of the strip-method of fly control, it is possible that Dieldrin-treated strips (either cloth or wire) may be available for use in the control of flies inside buildings in 1951. This program is still open for commercial exploitation and the degree to which it can be developed by market-time in '51 remains to be determined by marketing ingenuity and the attitude of labeling officials. It should be pointed out, however, that no trace of Dieldrin could be found in the milk of cows housed in barns where the strip method was utilized in some eleven premises in the state of New York.

Before closing, it should be pointed out that marketing of Dieldrin will be handled by the Shell Chemical Corporation in 1951 and a list of the major formulators who will have Dieldrin products available in 1951 can be obtained either from the Julius Hyman Company or the Shell Chemical Corporation. Furthermore, it would be advisable for anyone interested in obtaining supplies of Dieldrin or Dieldrin formulations for use in fly control activities in 1951 to so specify in contacting the manufacturers or formulators of this product. As stated above, special consideration will be given to those interested in the use of Dieldrin for the control of insects other than those attacking cotton. This will be done in order to encourage a more diversified use-pattern for the product.



Slicing ¾" wide rolls from a 3 foot roll of screen for use in the "Strip Method" of fly control described by Dr. Compton in the article above and as briefly summarized in the article below. After slicing, smaller rolls are then dipped into a bucket of emulsifiable concentrate, the screen unwound and finally stapled to the barn ceiling as shown on the front cover.

The Strip Method of Fly Control

This new method of spot treatment is based on studies of the habits of house flies in both the laboratory and field made by David Pimentel, H. H. Schwardt, and L. B. Norton, of Cornell University's entomology department in 1950. They found flies preferred the edges of boards, electric wires, strings, small pipes and other narrow objects as resting places. Flies were also observed to select a screen surface in preference to one of wood, glass, or metal. Wire screen strips placed close to the ceiling of a room proved particularly attractive as temporary resting places.

To test whether flies would rest on dieldrin-treated strips and remain long enough to receive a lethal dosage, ¾" strips of galvanized screening were treated with 15% dieldrin by immersing them in an emulsifiable concentrate and then allowing them to dry. Next the strips were stapled two feet apart on the ceiling of a room into which 20,000 flies were released. All of the flies were dead within 12 hours.

Strips treated with 15% or more chlordane, toxaphene or lindane emulsifiable concentrates gave average periods of effective control ranging from 4.5 weeks to 9 plus weeks. Strips treated with 15% dieldrin had good control of flies in six barns for an average period of 16 plus weeks or for the entire season.

A complete report of this method is reported in the January 1950 issue of *Soap and Sanitary Chemicals*, page 102.

Since announcement of the "strip method" some research centers report they have not obtained the control reported by Cornell. They said strips seem to become coated with dust, that flies become dieldrin-resistant, and that fly-habits change so that they do not rest on treated screen strips.

little fellow with BIG appetite

Aviator's helmet with fur completely eaten away by larvae of the webbing clothes moth. Cocoons are seen on the upper portion. (Photo by U. S. Department of Agriculture, Bureau of Entomology and Plant Quarantine.)

Tineola Biselliella Hummel has a monstrous appetite for a little fellow . . . especially when he is in the larva stage. His favorite dishes are fur, woolen garments, rugs and anything else derived from hair or wool. The damage he does runs into figures that almost are beyond belief.

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SERVING INDUSTRY . . . WHICH SERVES MANKIND

Report On Purdue Conference Continued From March Issue

Below is the second and concluding part of the report on the 15th annual Purdue PCO Conference, held in Lafayette, Ind., February 5-9. Part one appeared last month.

Rabbit Repellents

Z.I.P. and No-Nib'l, two products of the B. F. Goodrich Chemical Co., were described to delegates by the company's representative, D. L. Kent.

Both relatively new repellents, Z.I.P. is supplied as a paste formulation which is dispersible in water and which contains an adhesive. No-Nib'l comes as a packaged powder that has the same active ingredient as ZIP, but without the adhesive.

Working on a "taste" principal, these repellents have been found to be effective in keeping rabbits away from vegetable garden plantings, flowers, ornamentals, nursery stock, seedlings, orchard trees, etc. A 1 to 3% strength is all that is required. They have to be applied directly upon the area to be protected, therefore additional applications must be made if protection is to be provided new growths of treated plants. Distribution of both products is being handled by the Innis, Speiden & Co., Kent said.

Red Squill Research

During the last two years, Harlan Shuyler, son of PCO R. Shuyler in Kansas City, Kansas, has been working on a special PCO Research Fund Project which is striving to establish a reliable method of testing red squill effectiveness. A graduate student at Purdue, Shuyler presented a progress report which included a list of red squill baits considered best by those questioned in his industry survey. Varying percentages of ingredients in the following three baits indicate the range in which answers fell:

Fresh horsemeat	60—90%
Cereal (bread, oats)	0—20%
Red squill	6—10%
White bread	60—95%
Meat product (bacon, meat broth, fish "grease")	0—20%
Red squill	5—10%
Fresh salmon	85—90%
White cornmeal	0— 5%
Red squill	10%

The consensus of opinion among those surveyed was that red squill was most effective in the control of Norway rats.

"Tracking Dusts in Rodent Control" was discussed by C. Dyksterhouse, U. S. Public Health engineer from Chicago. Use of such dusts as Antu, DDT and others is not only valuable in leading the PCO to rodent entries, but also help give control of rodent ectoparasites that cause such diseases as typhus, plague and rickettsialpox, he said.

Bakery Sanitation

There are a great many unexplored opportunities for PCOs in bakery sanitation according to H. R. Mangus, a Purdue entomology graduate now working with the American Institute of Baking in Chicago. Speaking Tuesday evening, Mangus suggested there is room for new business in consulting services, in small plant sanitation, in greater control of insects, roaches, fungi and bacteria, in box car fumigation, and in getting paid for recommending elimination of poor sanitation practices.

A.I.B. has a department of sanitation which keeps members informed on how better sanitation can be maintained and gives assistance when clients are cited by regulatory officials. Periodic inspections are also made to determine evidence of insect and rodent infestation as well as objectionable fungicidal or bacterial development, the sanitarian pointed out. Poor cleaning habits, unfavorable storage conditions and the prevalence of poor personal hygiene are also included in such surveys. Mangus indicated more business can be awarded pest control firms which provide complete, honest, thorough and reliable service.

Genial Dr. B. E. Montgomery, assistant professor of entomology at Purdue, held the balance of Tuesday evening's program with interesting stories about his recent trip to New Zealand.

Purdue PCO students Aaron Fleischer, David Kotler, Arthur Wippman and R. L. Meyer were featured in the entomology part of Wednesday's program on ants. Prof. John Osmun, of the school's entomology department, was chairman for the session and discussed the general control of ants. Dr. H. O. Deay explained how relatively easy it is to recognize common species of ants. A paper on the control of Pharaoh's ants by Douglass Burnett was read by Martin Meyer of the Theodore Meyer Estate, Philadelphia.

On Wednesday afternoon six suppliers demonstrated their equipment on a program headed up by Purdue's extension entomologist Glen E. Lehker in the Judging Pavilion. Shown were: the B & G sprayer by William Brehm of the B. & G. Co., Philadelphia; a John Bean high-pressure Spartan power sprayer by Charles Partlow of Lafayette, Ind. assisted by the Lansing company representative, Virgil Knapp; and a PCO serviceman's kit by William J. Turrie of Wil-kil Co., Milwaukee. Charles Denny demonstrated a Drake carbon-tipped circular saw suitable for termite work which is manufactured by the Drake Saw Co., Maplewood, Mo., and G. M. Glidden of Acme Protection Equipment Co. in Chicago explained the advantages of his company's masks. A new and improved Aeromaster portable aerosol fog machine was demonstrated by W. H. Brigham of the Aeromaster Co., St. Louis.

PCOs for Defense

Dr. J. E. Christian, associate professor of pharmaceutical chemistry at Purdue, opened Wednesday evening's meeting on civil defense with an awakening address on atomic radiation and associated hazards. Professor Christian said it is definitely possible for animals, including rats and mice, to transmit radio-active material, but that the possibility of their carrying quantities great enough to cause any harm is rather limited.

Civil defense during war and the part to be played by commercial PCOs was clearly presented by Lieutenant Frederick Cretors, Indiana State Police, in charge of civil defense, Indianapolis, Ind. Referring to his own experiences in the past war, Lt. Cretors emphasized that there is a definite need for professional pest control service in time of national emergency, but that it was the industry's responsibility to tell civilian defense officials what it can do

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because in most instances they will not be aware of "your skills."

Reported at the beginning of this story was the part in this session taken by NPCA president, J. Edwin Sameth, and executive secretary, William O. Buettner.

Walter Gibson, Extermital Termite Service, West Lafayette, Ind., acted as chairman for Thursday morning's session on wood-infesting insects and rots. A detailed outline on termite problems arising from prefabricated and other new structural designs was presented by Charles Denny, Charles Denny Co., St. Louis, Mo. As soon as adequate photographs are collected to properly illustrate this paper it will be published in *Pest Control*. W. K. Delapane, Jr., Illini Pest Control and Service, Champaign, Ill. reported on his success with chlordane and DDT for termite control. Most of the jobs he treated with the former chemical in 1945 are still holding up, Delaplane said.

University of Illinois's associate professor of forestry, C. S. Walters, provided the conference with an illustrated talk on principles of wood construction as it relates to wood rots and their prevention. Purposes and achievements of the NPCA Approved Reference Procedures for termite control were then discussed by chairman of the association's termite committee, A. H. Bender, Bender Termite Control Co., Washington, D. C.

"One of the finest discussions I've ever heard on fumigation," was the comment made by one operator after listening to Karl Hassler's very thorough discussion of the subject, especially as it relates to methyl bromide. Mr. Hassler is secretary of the Pest Control Operators of California, Inc., Los Angeles division.

An abstract of the valuable report given by NPCA technical director, Dr. Ralph E. Heal, on new developments in household insect control will be published in a subsequent issue of *Pest Control* magazine. The talk given by Dr. W. N. Bruce of the Illinois Natural History Survey on the status of fly control appears in this issue.

Decker on Supplies

Referring to congressional hearings on the toxicity and residue limitations of pesticides used in all phases of food processing, Dr. George C. Decker told the concluding Friday morning meeting that it is essential to "make the public conscious of insecticides and educate them to the necessity for their use." Dr. Decker, who is entomologist at the Illinois Natural History Survey, said insecticides must be used with the same calculated risk as are such mechanical devices as automobiles, sewing machines, gas stoves, etc.

The whole issue of supplies is "confused," Dr. Decker remarked. It is tight and whether it will become better or worse depends on six factors: (1) intensity and extent of insect outbreaks across the country, (2) magnitude of military requirements, (3) exports being made under the Point IV program, (4) supply or shortage of basic ingredients, (5) availability of containers, and (6) transportation. "All of these are unknown quantities," he said.

At the present time, Dr. Decker revealed, no federally sponsored rationing of insecticides is contemplated, except at the ingredient level.

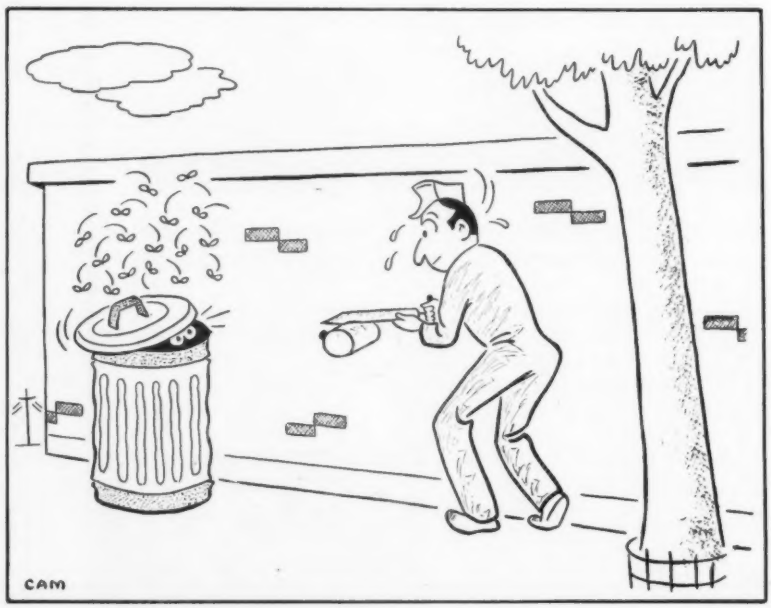
5 Attend 15 Years

Professor Davis announced at the Thursday night banquet that five among the registrants had attended all of the conferences given by Purdue in the past fifteen years. Certificates honoring such perfect attendance were awarded to William O. Buettner, C. Norman Dold, Harlem B. Ives, W. W. Scott and Jules Smith. Stephen O. Easter, entomologist working in the United Nations Food and Agricultural organization, was featured speaker at the banquet for which Dean Frank C. Hockema, vice president of the university, was toastmaster.

Honorary memberships in the National Pest Control Association were awarded at the banquet to Dr. George C. Decker and Dr. Carl J. Weinman, both of the Illinois Natural History Survey, Urbana.

As has been the usual custom in previous years, first day of this short course was devoted to the fundamentals of entomology under direction of members of the Purdue entomology staff, Prof. J. J. Davis, Dr. H. O. Deay, Dr. B. E. Montgomery, Prof. John Osmun and Glen E. Lehker. Dean of the School of Agriculture, H. J. Reed, welcomed delegates at the opening meeting.

A closed meeting for NPCA members was held Monday evening to discuss work so far accomplished in its management clinics committees.



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High Safety Factor — Approved by the USDA for lice and mange control on dairy cattle. Shows no contamination in milk when properly applied. Kills poultry insects by contact and does not taint eggs or meat when properly applied. Even used by dermatologists for human itch, lice and scabies. Not cumulative and practically odorless. Any taken in by a warm-blooded animal is eliminated.

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Legislation Chief Topic At California PCO Convention

By James Joseph—bureau chief
Western Round-Up

SOME 115 PCOs, assembled for the three-day, eighth annual Pest Control Operators of California convention in Riverside, Calif., Feb. 26-28, approved submission to the California legislature—after some revisions—of a bill which would tighten-up laxities in industry-wide practices.

The convention was in general agreement that some law is needed to pin-down infractions among California operators.

At the same time, delegates authorized their Board of Directors to engage in further discussions with the state Structural Pest Control Board and with Lyle Smith, proponent of the Smith Bill currently before the California legislature. The Association's Board is authorized to approve or disapprove the pending Smith bill in the name of the association. As it now stands, the proposed Smith bill would authorize State inspection of 10 per cent of the termite work done in California.

A substitute bill, offered by the association, would make prosecution under the present California act easier. It would: (1) make mandatory a report on the condition of earth-to-wood contact in a structure; (2) require operators to retain records of work for a 2-year period; (3) make it necessary to report relative height of foundations and piers in respect to existing grades; (4) specify the exact condition of the structure as found on inspection and what steps were taken to remedy faults; (5) prohibit any deviation in materials or methods from codes and generally accepted standards of the industry; and (6) strike from present act some legal terminology which has made it almost impossible to prosecute an operator if he swears that he did not find infestations during inspection.

Objections to the Smith Bill, which some call "restrictive legislation", were that it is impossible at this time to set absolute standards for judging the quality of termite work. Insiders predicted that although the association may borrow some sections from the Smith Bill, it would turn thumbs down on Smith's proposal to set-up mandatory, state-wide inspection.

Most delegates interviewed, however, felt that a bill of some sort is essential "to restore public confidence" in the termite industry.

New Officers Picked

Joseph Goulding, vice-president, Terminix Co., Los Angeles, was elected president for 1951; Wayne K. Davis, Ailing House Termite Control Service, Berkeley, Calif., was picked to be first vice-president; Robert B. Mesecher, Bob's Termite Service, Burbank, second vice-president; and new treasurer is Darrell Cardiff, Cardiff Pest Control, Santa Cruz, Calif. Karl Hassler was again named association secretary.

Supports Warfarin Claims

George G. Greenhalgh, Rodent Specialist, Los Angeles Health Department, reported to the delegates on the use of warfarin in rodent control. Greenhalgh said his department has been using warfarin during experiments in public buildings since the spring of 1950 and has found it an effective rodenticide. "Our experience," he declared, "parallels that claimed for the rodenticide."

Los Angeles area experiments with warfarin, he said, were conducted in public buildings and in one city dump. The chemical was applied in yellow corn meal. "We first exterminated them out of a building," he continued, "and then stopped up the structure." After warfarin had been used, subsequent use of tracking dust failed to indicate the existence of rodents.

He recommended definite safeguards against harmful exposure to children or to animals. Prebaiting, he declared, was found to be unnecessary. Greenhalgh recommended "signing" the area in which the chemical is used, specifying warfarin has been applied. For protection to non-rodent life, use of bait boxes was recommended.

Concentrations found effective included a finish bait of .025 per cent warfarin. The commercial concentrate of .5 per cent warfarin and 95.5 per cent inert dust or other diluent, were, in the Los Angeles experiments, generally mixed with 19 parts of meal by weight. "Dry bait is probably the safest," Greenhalgh told the PCOs, "and I would not recommend meat bait."

Visit Experiment Station

During the convention's second day, delegates were conducted through the University of California's Citrus Experiment Station at Riverside. One of the nation's leading research laboratories of its kind, the Riverside station has done extensive research on various agricultural pests including citrus flies. Delegates got a first-hand view of the station's work, which was explained by Drs. Robert Metcalf and Ralph March. These researchers have collaborated during the last few years in extensive studies on the methods and effectiveness of residual control for house flies.

Overlapping Jurisdiction

The overlapping and oftentimes confusing jurisdiction of the Agricultural Pest Control Act and the Structural Pest Control Act over PCOs was discussed by Dr. Allen B. Lemmon, chief of the Bureau of Chemistry, State of California. Lemmon declared that where there is an apparent conflict, the purpose for which the work is being done governs the jurisdiction of authority. This important clarification involves operation under either an agricultural or structural pest control license. A common conflict in California is pest control on citrus trees — for instance ants — when the source of the pest is a nearby building. Far from being academic, this practical day-to-day problem makes it necessary to decide under which license an operator is required to work—an agricultural one, for the infested trees; or a structural permit, governing structural de-contamination.

Senn On PCOs In Defense

Just what part the California pest control industry will play in national defense — especially in time of emergency—was outlined briefly by Charles Senn, engineer director, Dept. of Sanitation, Los Angeles Health Department. Senn advised PCOs that they can fit importantly into the defense picture in California. One recommendation, which the Association plans to instigate, was that the association make an industry-wide equipment and supply inventory, to be turned over to civil defense authorities. These facilities to combat infestations could be called out after wholesale bombings.

Some interesting observations were brought to delegates by W. Dwight Pierce, Ph.D., and Curator of Entomology, the Los Angeles County Museum. Dr. Pierce pointed out that while his section of the museum is engaged in the collection and classification of insects, thousands of inquiries have been received from the public about home-destroying insects. "If I were to judge by inquiries coming to the museum," he said, "the public's greatest concern is in insects which invade homes or places of business." In his 14 years with the museum, he said, there have been 10,626 calls in person or by phone for advice or determination of just what insects affect structures and plant life. "Of the total calls we receive," declared Dr. Pierce, "some 29% are related to pest control."

Other speakers included: Norman Ehman, entomologist, Los

Candids at the Riverside Convention

Top: H. C. Smith, past president, 1949, PCOs of Calif.; E. Arnold Alderman, 1950 president, PCOs of Calif.; Lyman P. Pinkston, 1949 president of Los Angeles PCO Ass'n. chapter; and Karl Hassler, secretary, Pest Control Operators of California, Inc.

Second Picture: Some of the Southern California operators discussing proposed legislation: Vernon E. Murdock, Murdock Vermin Control Co., Redlands; G. B. Warders, Antimite Associates, Upland; Dell Williams, Williams Pest Control, Pomona; and W. L. Frazier, Frazier Termite Center, San Bernardino.

Third Picture: C. C. Delk, Delk Pest Control, Fresno, registers at the convention; left is J. W. Killinger, Jack The Ant Killer, Napa; second from the right, in background, is G. G. Aitkenhead, N and T Chemical Co., San Francisco; right is Max Barrot, Max Barrot Ant Control, Palo Alto.

Bottom: The ladies had fun too . . . (left to right around the table beginning with the lady with a plume in her chapeau) Mrs. E. Arnold Alderman, Santa Barbara; Mrs. M. F. McCartney, Pasadena; Mr. Joe Goulding, 1951 president, Los Angeles (kibitz'ng); Mrs. Edith Pellern, San Diego; and Mrs. George Rigney, Alhambra.

Angeles City Health Dept., who outlined work of PCOs in Los Angeles food-handling industries; and R. W. Hunt, entomologist, instructor in structural pest control, extension division, U.C.L.A., discussed "What should you know to pass the examination for a 'D' operator's license?"

Some 180 PCOs and their wives attended the last-evening annual banquet where Dr. Ralph Heal, NPCA technical director, told of the value of NPCA membership. Earlier, Dr. Heal had recommended individual membership in the NPCA to support national legislation. Approximately 50 California association members have joined the national association.

Ladies Revel

The ladies, too, were out in force at the Riverside convention. Among the prominent wives in attendance were Mrs. E. Arnold Alderman, Santa Barbara; Mrs. M. F. McCartney, Pasadena; Mrs. Joe Goulding, Los Angeles; Mrs. Edith Petterin, San Diego; Mrs. Geo. Rigney, Alhambra; and Mrs. J. M. Phillips, Santa Barbara.

Sitting down for a game of bridge while their husbands attended lectures, were Mrs. Mary L. Hogan, South Pasadena; Ruby Frazier, San Bernardino; Mrs. Kay Aitkenhead, San Francisco; Mrs. Cathy Mesecher, Burbank; Mrs. Margaret Fox, Hollywood, and Mrs. Rose McKeever, Glendale.

Loyalty Oath Proposed For Calif. Pest Control Licenses

All persons licensed to do business by 34 state boards and commissions would be required to take an oath of loyalty to the United States by a bill introduced in the California Senate by Senator Hugh Burns, Fresno. Among others the bill, if enacted, would apply to pest control licensees, licensed by the Structural Pest Control Board.

The loyalty oath would become part of the present Business and Professions Code and would affect about 35,000 professional men, contractors and certain businessmen now licensed by the state to practice professions or conduct business.

The bill, if it becomes law, would greatly extend the state's power to license and police the various professions and trades. Until now, licensing has been used primarily as an instrument to maintain and enforce certain minimum professional and business standards and ethical conduct.

Ninety days after passage of the measure all licensees would be required to file an affidavit of loyalty, the same oath all state employees take. Failure to comply would result in cancellation of license which would prevent the licensee from continuing his business. Filing a false affidavit, perjury, would be punishable by imprisonment in the state prison for not less than one year or more than 14 years.

Applicants for licenses would be required to take the oath of loyalty at time of filing application.

The loyalty oath prescribed by

(Continued on page 42)

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25 lbs.	11.00	100 lbs.	35.00

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PEST CONTROL

NEWS

Dr. H. L. Haller

Haller New BE&PQ Asst. Chief

Dr. H. L. Haller, U. S. Department of Agriculture scientist, has been appointed Assistant Chief, Bureau of Entomology and Plant Quarantine, in charge of insecticides and chemical problems relating to pest control, according to an announcement by Avery S. Hoyt, Bureau Chief.

Dr. Haller, who has made numerous contributions to insecticidal research, has been special assistant to the Bureau Chief since 1947.

Graduating from the University of Cincinnati and Columbia University, Dr. Haller first entered the Department in 1919. After six years as an associate in chemistry at the Rockefeller Institute for Medical Research, he returned to the Department in 1929.

Chief among Dr. Haller's contributions was the determination, in collaboration with Drs. F. B. LaForge and L. E. Smith, of the chemical structure of rotenone, a naturally occurring plant insecticide.

His new assignment will include the development, manufacture and use of attractants, repellents and accessory materials, in addition to serving as liason officer between the Bureau and manufacturers of insecticides and insecticidal chemicals.

Entoma Begins 9th Edition

Entoma, reference book of pest control supplies and equipment, is currently being prepared for a 9th edition by the American Association of Economic Entomologists.

Started by Association entomologists to further scientific pest control work, Entoma lists insecticides, fungicides, seed disinfectants, supplies, apparatus, and machinery used in pest control.

Entoma is written to acquaint the operator, manufacturer and distributor with the products and sources of pest control industry and research. It is in its 16th year of publication.

Individual bold-face listings are available to pest control firms in the new Entoma at $1.50. After this initial fee copies will be mailed free of additional charge, as soon as the publication is issued.

Companies wishing to carry such listings in the current edition of Entoma should contact George S. Langford, Editor, Entoma, University of Maryland, College Park, Maryland.

Shrimplin Ties Knot

Nuptial vows have been exchanged between William J. Shrimplin, Rose Exterminating Co., New York, and Mrs. Gladys Miller Clapsaddle. Ceremonies were held February 17 in Baptist Church of the Redeemer, Brooklyn, N. Y.

Shrimplin and his bride left after the ceremony, to spend their honeymoon in Atlantic City, New Jersey.

Florida PCO Tests Set

Newell Hall, University of Florida, Gainesville, Florida, will be the scene, April 30 - May 2, of the next scheduled examination for certification of structural pest control operators in Florida.

Announcing the examinations, L. A. Hetrick, secretary of the Florida Structural Pest Control Board, said they will be held in five separate categories, including general principles of entomology, economic zoology and construction, termites and other wood infesting organisms, general household pests, rodent control and fumigation.

Those interested in obtaining certification as Florida pest control operators should write to the secretary, Florida Structural Pest Control Board, P. O. Box 2728, University Station, Gainesville, Florida. Information and application forms will be forwarded, on request.

New Handbook Is Readied

A "Handbook of Agricultural Pest Control" is being prepared for publication early in April.

Written by Dr. Stanley F. Bailey, professor of entomology, and Leslie M. Smith, associate professor of entomology, both of the University of California, the handbook will run 160 pages, is to be published in a pocket-size (5x 7½ inches), and will have a flexible leatheroid cover, suitable for field use.

Costing $3.25, the book covers agricultural chemicals, their rates of application, useful formulas, as well as individual chapters on fumigation, spray machines, dusts and dusting and numerous other phases of agricultural pest control technique.

Orders for the handbook, along with check or money order, should be sent to *Pest Control* magazine.

DAVID W. LYNCH, well known in the insecticide, chemical and drug field, has joined the Chicago branch of the Prentiss Drug & Chemical Co., New York, as mid-west sales manager, according to an announcement by A. W. Beverwick, vice-president. Mr. Lynch recently resigned as sales manager of the insecticide division of Velsicol Corp., Chicago, with which he had been associated for the past three years. He will make his headquarters at the Prentiss Chicago office, 9 South Clinton Street.

THE NEW, MIXED, READY-TO-USE

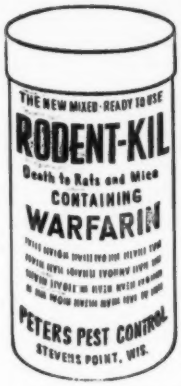
RODENT-KIL

CONTAINING

WARFARIN

WARFARIN is a patented product discovered in the University of Wisconsin biochemistry laboratories and developed by the Wisconsin Research Foundation.

1. Rodent-Kil is a slow killer. No bait shyness.
2. Rodent-Kil will kill both rats and mice.
3. An outstanding advantage of using Rodent-Kil is the relative safety for humans, pets and domestic animals.
4. Our mixture is: meat scraps - cod liver oil - cheese rind - steamed bone meal - fish meal - salt - tomato pomace - dried cheese whey-corn flakes.
5. This product is dehydrated and will not decompose, mold or turn sour.
6. Rodent-Kil is the REAL answer to your pest control problem.



Rodent-Kil is packed in the following sizes:

1 lb. cans $ .60
(for your label)
Retails at $1.00

25 lb. drums 9.25
50 lb. drums 17.00
100 lb. drums 31.00

Write for prices on ton lots.

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Manufacturers and Distributors of

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Each product designed for easy, economical, and effective use—attractively packaged to bring fast over the counter sales.

Performance of each product unconditionally guaranteed. Whether used in service work or sold retail you are assured of customer satisfaction. For service work and retail profits, they can't be beaten!

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Hudson Industro* Sprayer

Pest control operators find this sprayer ideal for applying insecticides at correct pressures and spray patterns for best results. Pressure up to 80 lbs. Choice of galvanized or stainless steel tank. Model shown here has 2¾ gal. cap.; also available in 4 gal. size.

Hudson Wizard* Lektrik-Spray*

The fast, easy way to spray all insecticides. Dual purpose nozzles give either wet residual spray (surface) or fine mist (space). Model shown has time switch—permits operator to place sprayer in room to be treated and let sprayer run unattended. Stops automatically at desired time.

ALL PURPOSE POWER SPRAYER

Will handle any pest spraying or sanitation problem! Model shown has 50-gal. tank; produces 400 lbs. pressure per sq. in.; delivers up to 4 gal. per minute. Also available with 30-gal. tank, producing 250 lbs. pressure per sq. in. Timken bearing wheels and pneumatic tires for easy handling.

SIGN OF THE BEST BUY

HUDSON

Tested and Proved
SPRAYERS AND DUSTERS

*Trade Mark

What are your pest control problems? For assistance, write Dr. Wm. Dickison, c/o H. D. Hudson Mfg. Company, 589 East Illinois St., Chicago, and give full details. No obligation, of course.

H. D. HUDSON MANUFACTURING COMPANY

589 EAST ILLINOIS STREET • CHICAGO 11, ILLINOIS

Bills Up Insecticide Fees

Legislative assemblies in Utah and Oklahoma have passed bills upping the brand registration fees for insecticide manufacturers.

Effective July 1, the Utah bill will require an annual fee of $5 for each economic poison registered, with a maximum of $50. Oklahoma, whose bill is effective immediately, will jump registration fees for each brand or economic poison from $2 to $5.

Other legislation relative to insecticide registration and regulation is being considered in West Virginia (Senate Bill 189), Tennessee (Senate Bill 704), New Jersey (Assembly Bill 123) and Washington (House Bill 75). Generally, the trend of these considerations is toward higher individual registration fees, and higher maximums.

The Washington bill, which relates to regulation of pesticide poisons, will, if passed, submit all toxic or secondary reaction pesticides to the director of agriculture, who may ban their use if he deems them detrimental to agriculture or public health.

Manufacturers desiring more information on the status of these pending bills should contact their respective state legislators.

NCPA Advises PCOs On Defense

"It is the pest control operator's duty as a citizen to donate, without cost, his specialized services to civil defense efforts." This is the keynote of the National Pest Control Association's latest advisory bulletin, "Civil Defense."

The bulletin advises operators not to attach themselves to local or city defense groups, "since if those towns were bombed, the PCO might perish with the rest of the population."

Members are urged to organize through their state associations. However, when no state organization exists, operators "should assume leadership and establish a group to work in civil defense, inviting *all* pest control men.

PCOs with questions or comments are urged to communicate with the NPCA, 30 Church Street, New York 7, N. Y.

Chlorine, Benzene Short

Defense emergency needs have cut sharply into an already tight supply of chlorine, benzene and other pesticide ingredients, says W. R. Allstetter, U. S. Department of Agriculture official.

Allstetter, deputy director of the Department's office of materials and facilities, said he hoped to obtain, through a general survey, a "realistic basis" for distribution of the war-curbed materials. Each state has supplied a special technical advisory committee to aid in the survey, and reports were to have reached Washington not later than March 19.

Allstetter reported that four major pesticides are involved in the shortage: DDT, benzene hexachloride, toxaphene and the weed-killer, 2,4-D.

Allstetter said everything is being done to insure a fair distribution, but warned users of pesticides they should inaugurate flexible programs, and be prepared to shift to substitutes.

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Follow the Crowd With PER-MO Profits

★ **Per-Mo 5 Year Guarantee Moth Proof Liquid**
Packed in Pints, Quarts, ½ gals., gals., and 5 gal. containers

★ **Per-Mo Flameproof Liquid**
Packed in Gallon containers or in Drums.

★ **Per-Mo Rat & Mice Liquid**
Packed in 8 oz. bottles or in gallon containers.

★ **Per-Mo Rat Bits Made With Red Squill (Fortified)**
Packed in 4 and 16 oz. containers or in Bulk.

★ **Per-Mo Rat Paste, Made With Red Squill (Fortified)**
Packed in 4-8-16 oz. jars, and in Bulk.

★ **Per-Mo Rat Paste, Made With Antu**
Packed in 4-8-16 oz. jars, and in Bulk.

★ **Per-Mo "Chek" Deodorant**
Packed in Quarts or in Gallons.

WE WILL SHIP YOU A GENEROUS SAMPLE OF ALL THE ABOVE PRODUCTS FOR $5.00 EXPRESS PREPAID.
Send Check or Money Order.

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STANDS THE TEST
IT'S BY FAR THE BEST

★ All Per-Mo Products Packed Under Your Private Label If Desired.
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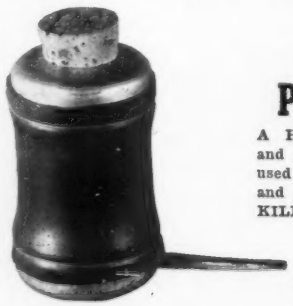

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PATENT INSECTICIDE

POWDER BLOWER

A HANDY BLOWER using rubber and a copper-steel spring that can be used in all positions saving powder and getting into spots where powder KILLS all crawling insects.

PRICES
1 dozen $12.00
5 dozen or more $9.00 doz.
f.o.b. St. Louis, Mo.

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NEED HOSE?

Then get PCE's long-wearing light weight, kink-resistant and oil-resistant hose! It's the finest money can buy. Available from stock with or without fittings. Check your needs now!

Prices Will Be Furnished On Request

¼" I. D. (working pressure 250 PSI; bursting 1500 PSI)

3/8" I. D. (working pressure 200 PSI. bursting pressure 1000 PSI)

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Chlordane, oil concentrate, liquid emulsifiable concentrate, wettable powder concentrate, and ready-to-use liquids and powders.

Super Fluorex V, powerful insecticide powder

Sodium Fluoride

Poison Seeds

Pyrethrum and **DDT,** powders and liquids

Paradichlorobenzene

FOR EFFECTIVE RAT CONTROL

Phosphorous Paste
Rumetan (Zinc Phosphide)
Fortified Red Squill Extract and Powder
Antu and **Antu Tracking Powder**
Thallium Sulphate
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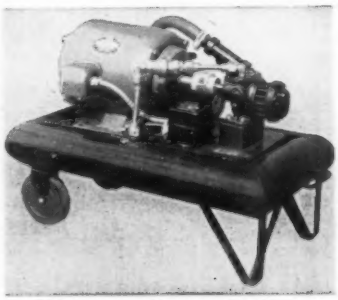
PRESHUR-MITE Portable Sprayer Tops in Performance

L. S. "Bugs" Bridges, popular and well-known PCO from Baton Rouge, La., says:
"I have been using my Preshur-Mite Sprayer for the past three years, and I would not exchange it for any I have ever seen before. The service Mr. Ewing renders a customer who owns one of his machines is most valuable, too. I personally feel that Mr. Ewing should be complimented on providing the industry with one of the best and most economical machines on the American market."
Mr. Bridges is one of many valued customers who know by years of experience that the Preshur-Mite line is outstanding for both quality and economy. Take a tip from these satisfied PCO's and give Preshur-Mite a try.

The Automatic PRESHUR-MITE

Heavy duty unit designed for termite control work. Pressures up to 225 lbs. PSI and up to 5 gals. liquid per minute. Features automatic pressure switch. Works direct from drum. Weighs only 127 lbs.



The Junior PRESHUR-MITE

Ideal for all types residual spraying, moth proofing, roach and termite control work, etc. Compactly designed for easy handling. Will stand up under rugged treatment. Pressures up to 125 lbs. PSI and up to 2½ gals. liquid per minute. Weighs only 44 lbs.

Complete line of 5 Preshur-Mite models to select from. Electric or Gasoline powered. Priced from $145.75 to $361.86 f.o.b. Jackson, Miss.

Write for New Catalog and Price List

Ewing Manufacturing Co.
P. O. Box 1986 Phone 3-0343
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Hudson Offers Nebulizers

H. D. Hudson Mfg. Co., 589 E. Illinois St., Chicago 11, Illinois, has prepared a special counter display of Hudson Nebulizers for spring and summer selling.

Hudson sprayer display

Manufacturers of sprayers and dusters of all kinds, the Hudson company says the display comes in three colors, and will show four sizes of the Nebulizer, the smallest being mounted for quick, easy demonstration.

Nebulizers are characterized by a unique nozzle, which breaks the insecticide into fine particles and prevents settling. Scientifically controlled tests, Hudson maintains, proved this feature provides a 25% increase in fly-kill.

Theme of the promotion — "Fight Disease-Kill Pests"-will be supported with extensive consumer advertising in mass circulation magazines. Company officials believe this publicity will be the greatest ever done on hand sprayers.

PCOs interested in obtaining information on the display can write to Hudson's General Office in Chicago, or to any of its branch offices.

Operators Face Larceny Charge

Two licensed pest control operators, and a Board of Education regional engineer have been indicted on a charge of grand larceny, in action pressed by a New York county grand jury.

Accused of taking $12,000 on unfulfilled Board of Education contracts in the past three years, the three men pleaded not guilty, posted bond and were released, pending trial.

Go-between for the alleged operation was the regional engineer, who allowed the PCOs to submit bills and receive payment for work not done. Gift of a television set by the operators, it was alleged, began the fraudulent dealings.

Conviction on all counts and maximum penalty could mean ten years imprisonment for each of the operators, and 35 years plus $20,000 fine for the regional engineer.

Hunt Readies Mail Course

R. W. Hunt, lecturer at pest control extension courses recently held in Los Angeles, California, is preparing to send his lessons by mail to those unable to attend the extension courses.

PCOs interested in taking Hunt's correspondence course, which was to have been available about March 1, should contact Alice C. Rowbotham, Head, Correspondence Instruction, University Extension, University of California, Berkeley 4, California.

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USE
PENDANE (LINDANE)
10% EMULSIFIABLE
10% OIL SOLUTION

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March Reader's Digest
on Warfarin
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These Concentrates are well suited to the requirements of the PCO.

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MAKE MONTHLY SERVICE CALLS MORE PROFITABLE

Suggest the Sensational
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DEODORIZER
To Your Customers

Yes, your monthly service calls can be made more profitable by getting in touch with us right away. The all-electric ELECTRO Deodorizer is just the thing for rest-rooms, storage rooms, etc. Door controlled type deodorizer also available.

For information on how you can make more profits, write or phone now!

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Before you buy an applicator--

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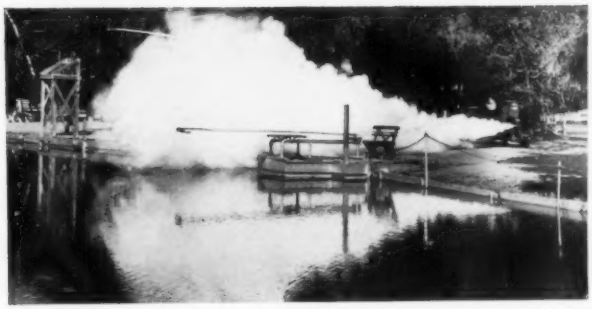
TODD INSECTICIDAL FOG APPLICATOR

Carrying Underwriters' Listing Seal



LOOK OVER THE FIELD before you decide on a fog applicator. Is range of control of droplets from ½ to 200 microns? Can the unit handle solutions, emulsions and suspensions? How about the unit's over-all efficiency—how many flies, mosquitoes or other insects does it kill per dollar?

YOU'LL FIND TIFA satisfies on every count . . . saves you time, trouble and money. **TIFA** has the Underwriters' Listing Seal — your guarantee of top performance. And remember — there will never be any substitute for experience: **TIFA** is backed by 10 years of manufacturing fog-machines!

Your "kit of tools" to be complete must contain TIFA

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TERMITE CHEMICALS

have 20 years of satisfactory and effective service behind them.

TOX-EOL 12½ to 1 CONCENTRATE

contains not one but a combination of toxic elements including pentachlorophenol, which have been found most satisfactory in the control of subterranean termites and are acknowledged by authorities to be more effective than any single toxic element.

SOLD ONLY TO PCO'S

Write for our dealer plan with 5 year Warranty.

Exceptional sales literature and advertising helps available to licensed contractors.

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Pioneers in the use of chlorinated phenols for termite control.

PEST CONTROL

PRIMER

BY JACK RATCLIFFE

Questions and Answers

In the first three issues this year we've covered a small part of elementary entomology. In Primer columns last year, we discussed other entomological principles. Here are a few questions that often are found on certifying examinations. We've printed the answers upside down below, but try not to yield to temptation until you've decided you just can't come up with the right answers.

1. Which of the following are *true* insects: flies, spiders, mites, millipedes, maggots, scorpions, crawfish, moths, centipedes, shrimp, lice, ticks, sowbugs, termites, chiggers.

2. Insects are the only animals without bony skeletons that develop wings. (true or false?)

3. All insects develop wings. (true or false?)

4. Birds learn to fly before they are fully mature. (true or false?)

5. Bats learn to fly before they are fully mature. (true or false?)

6. Insects learn to fly before they are fully mature. (true or false?)

7. List the stages of development in the life histories of the following: flies; roaches; centipedes; ticks.

8. Young fleas look like miniatures of the parents. (true or false?)

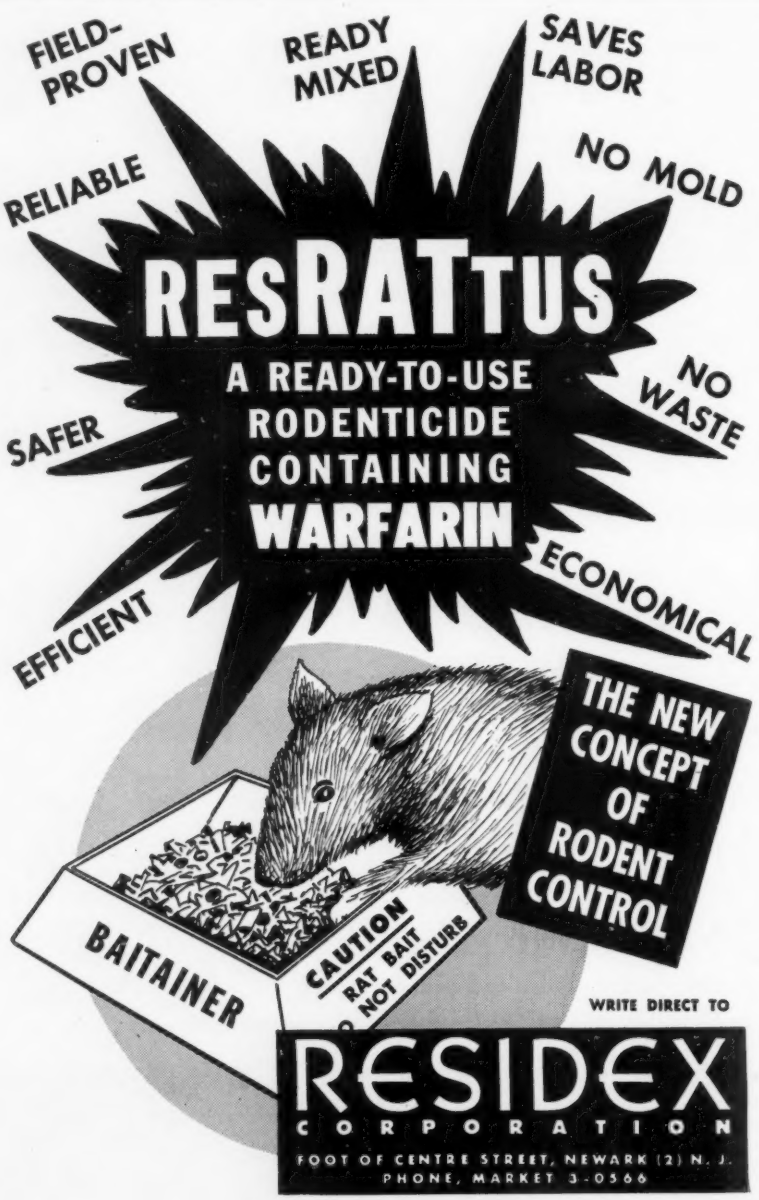
9. All flies, fleas, moths, ants and beetles have four stages in their life histories: egg, larva, pupa and adult.

10. Discuss how insect growth mechanics differ from the growth of dogs or human beings.

ANSWERS

1. Flies, maggots, moths, lice and termites are true insects. All the others listed are closely related to them, but are not true insects. (Note: Spineless animals with external, shell-like skeletons and jointed legs are all closely related. The entire grouping is called the Arthropods, which means "joint legged". Insects are but one class in this broad grouping. Insects are also known as Hexapods because they are six legged.)
2. True.
3. False. Many species are wingless and still others have non-functional wings.
4. True.
5. True.
6. False. Immature insects do not have wings capable of flight.
7. **Flies:** egg, larva or maggot, pupa, adult. **Roaches:** egg, larva or nymph, adult. **Centipedes:** egg, larva, adult. **Ticks:** egg, 6-legged nymph or larva, 8-legged nymph, adult.
8. False. Fleas are insects of complete metamorphosis. The young are white legless worms completely different from the adults in appearance and form.
9. True. The five orders of insects listed are all insects of complete metamorphosis. All other insects and arthropods which PCOs commonly encounter have life histories of gradual metamorphosis. (Note: mosquitoes are of the same order as flies. Bees and wasps are in the same order as ants.)
10. Insects have rigid external skeletons which cannot stretch. To grow beyond this point the insect must exchange the small old shell for a new and larger one. Dogs and human beings grow by enlarging the bony skeleton to accommodate the increasing mass of flesh and tissue. Insects grow by means of a series of external skeletons, each larger than its predecessor.

Pest Control Notebook will be resumed next month.



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Tests conducted by the U. S. Department of Agriculture, in addition to laboratory and actual field tests have shown that Lindane and Benzene Hexachloride gives effective control of flies and mosquitoes in both the larvae and adult stages.

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PRICES AVAILABLE ON REQUEST

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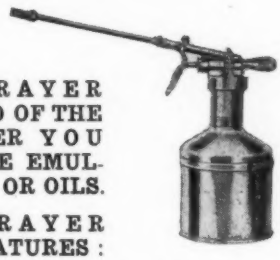

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ORGANIZATION NEWS

Canada PCA Readies Conference

Canadian PCOs have announced the program for their 9th Annual Pest Control Operator's Conference at the Ontario Agricultural College in Guelph, Ontario, May 7-9.

Officials of Canada PCA have bent every effort toward building an interesting and comprehensive program, which includes studies in fundamental approaches to pest control, rat-borne diseases, new fumigation techniques, civil defense, insect identification and proper operation of pest control firms.

Members will be housed in the college dormitories, and will be able to bring their wives and families as well, since a special section of the dormitory has been set aside for them.

Initial registration fee is $14, plus $3.50 per day which covers room and board for an adult, or $1.00 per day for children between 5 and 9.

Opening day morning sessions will be devoted to fundamentals in zoology (crustacea), biology (growth and regeneration), chemistry (solubility and compatibility of insecticides) and general pest control. Speakers include Dr. W. E. Heming, Father O. Fournier, Prof. L. A. Birk and A. J. Musgrave.

Biology of the rat, rat-borne diseases, rodenticides, hazards, application methods and necessary equipment for the pest control operator is to be the subject of that afternoon's work, with Drs. A. E. Kingscote, R. E. Heal and J. J. Parent and S. Burton heading the group.

Leading the way at the first evening session will be H. Corbett and Dr. Heal, who are to speak on operations of a pest control firm and civil defense.

Drs. C. R. Twinn and R. E. Heal, in addition to L. A. O. Roadhouse, M. E. King and H. A. U. Monroe lead discussions, Tuesday morning, on pest control insecticides and formulations plus the latest in fumigation research and atmospheric vault fumigation.

Tuesday afternoon's session will see a demonstration on identification of household and industrial insects by Prof. R. H. Ozburn and staff.

Dr. J. J. Davis, it is hoped, will be present for the second evening session to speak on proper methods of termite control. There is to be an additional talk by Dr. R. O. Bibbey on weed control.

General pest control problems is the subject offered on a symposium being held Wednesday morning.

Canada PCA's annual business session takes place at 2 P. M. on Wednesday afternoon, and following elections and committee reports, members adjourn to the college cafeteria to attend the gala banquet. Dr. R. Glen, Chief of Divisions, Entomology, Canadian Department of Agriculture, Science Service, speaks after dinner on "Some Aspects of Canadian Entomology."

Some few changes may be made in the program, but substantially it will be given as mentioned.

D. W. Sanderson, secretary of Canadian PCA, is glad to answer any questions on the conference. He may be reached at 64 Wellington St., W., Toronto, Ontario.

Fuller New Omaha PCA Prexy

Floyd Fuller, of Fuller Exterminating Co., was elected president of the Omaha, Nebraska Pest Control Association at a meeting held February 15 in Omaha.

Others elected to office were: John P. Linn, Industrial Pest Control Co., vice-president, and Roy Mason, Cody Pest Control Co., secretary-treasurer.

How and why Omaha PCA members should aid defense mobilization plans was the principal topic of the evening.

La. PCA Chooses '51 Officers

Meeting in Baton Rouge, Louisiana, on January 28, the Louisiana PCA elected the following new officers: W. A. Sharp, Orkin Exterminating Co., Shreveport, president; Paul Adams, Adams Exterminating Co., Alexandria, vice-president; J. H. McBride, Burmac Termite Control, Shreveport, secretary-treasurer.

Thirty-five attending members voiced their opinions on Louisiana PCA participation in the state civilian defense effort. President Sharp says a definite program is being pushed, and hopes a positive policy and commitment can be established with State Civilian Defense Director Lt. Governor Dodd.

Sharp reported that Dr. O. W. Rosewall, Professor of Entomology at Louisiana State University, is available for speaking engagements. State association interested in having Dr. Rosewall address their meetings should contact him at the University in Baton Rouge.

CALENDAR OF MEETINGS

Environmental Sanitation Field Training Course, U. S. Public Health Service, New York Field Training Center, Buffalo, N. Y., April 9 - June 20; repeated Sept. 10 - Dec. 1; given also at USPHS Topeka Field Training Center, Topeka, Kansas, Aug. 27 - Nov. 17; also at USPHS Pittsburgh Field Training Center, Pittsburgh, Pa., Sept. 10 - Dec. 1; also at Public Health Training Center, Bloomington, Ill., Sept. 17 - Dec. 7; and at USPHS New England Field Training Center, University of Mass., Amherst, Sept. 24-Dec. 14.

PCOs of California, Los Angeles District Meeting, Roger Young Auditorium, Los Angeles, April 16.

New England PCO Ass'n Open Meeting, Hotel Lenox, Boston, Mass., 8 P. M., April 26.

Chemical Specialties Mfgrs. Assn. Mid - Year Meeting, Drake Hotel, Chicago, Ill., April 29-May 1.

Florida Structural Pest Control Board Examinations, Newell Hall, University of Florida, Gainesville, Florida, April 30-May 2.

Canadian Pest Control Assn. 9th Annual Conference, Ontario Agricultural College, Guelph, May 7-9.

National Restaurant Show, Navy Pier, Chicago, May 7-11.

Fly Control Course, Communicable Disease Center, Atlanta, Ga., May 7-11.

National Sanitary Supply Assn. Conference & Show, Hotel Hollenden and Public Auditorium, Cleveland, Ohio, June 3-6.

Fifteenth Annual Convention National Association of Sanitarians, Miami Beach, Florida, August 21-25.

Field Day of Connecticut Agricultural Experiment Station, New Haven, Conn., Aug. 22.

Rat-Borne Disease Prevention and Control Course, Communicable Disease Center, Atlanta, Ga., Oct. 1-19.

Special Training in Insect Control, Communicable Disease Center, Atlanta, Ga., Oct. 22-Nov. 2.

National Pest Control Assn. 19th Annual Convention, Hotel Statler, Boston, Mass., Oct. 29-31.

American Public Health Assn. 79th Annual Meeting, Civic Auditorium, San Francisco, Calif., Oct. 29-Nov. 2.

for Dependable

TERMITE *Control*

CHIPMAN SODIUM ARSENITE

Stops and prevents termite entrance from parent soil colony. Used for treating foundation timbers, infested beams and sills. A gray powder — soluble in water or applied in dry form. Contains 75% arsenious oxide, killing ingredient.

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Concentrated sodium arsenite solution. One gallon is equivalent to 5.33 pounds of Sodium Arsenite in dry form. Used with equal effectiveness as a water-mixed solution.

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DEPT. T. BOUND BROOK, NEW JERSEY

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Your Pest Control Business

In New York, Pennsylvania, Ohio, Indiana, Maryland, Virginia, West Virginia and Kentucky. Interested in businesses with sizable volumes and good reputation. Present management retained in most instances. Will also consider financial assistance and promotion of businesses on profit-sharing arrangement. In reply, please give all pertinent details, in strict confidence, to Mr. L. L. Crosby,—

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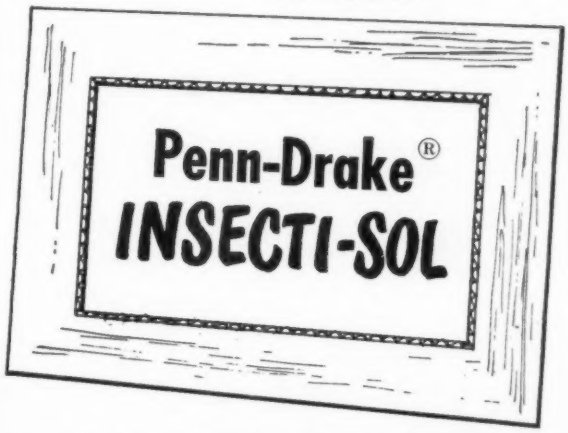

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Penn-Drake SUPER-SOL

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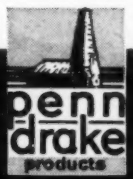

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When answering ads where box number only is given, please address as follows: Box number, c/o Pest Control, 1900 Euclid Building, Cleveland 15, Ohio.

Rates: "Position Wanted" 5c per word, minimum, $1.00. All other classifications, 10c per word, minimum $2.00. All classified ads must be received by Publisher at least two weeks preceding publication date and be accompanied by cash or money order covering full payment.

TRADE-MARK FOR SALE

"Die-U-Rat." Federal Trade-Mark Registration No. 265,079, for rat exterminator for sale at a reasonable price. This trade mark is valuable and purchase offers are solicited from rat poison manufacturers, whose products would sell better under this trade-mark. Write Box 245, Pest Control magazine.

FOR SALE

Dyna-Jet Fog machine. Excellent condition. Used one season. Liberal discount. Write Graham Exterminators, 2812 NW 46th St., Oklahoma City, Oklahoma.

William G. Krummrich

William G. Krummrich, vice-president of Monsanto Chemical Co., and general manager of the Organic Chemicals Division, died February 27 at Barnes Hospital in St. Louis, Mo.

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NO POISON • NO BAIT

SHUR-KATCH RAT and MICE GLUE PADS

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Rat and Mice Glue also supplied separately for preparing own Glue Pads and Boards.

WRITE NOW FOR DETAILS AND PRICES

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323-27 West 16th St. New York 11, N. Y.

N. Carolina PCOs Organize

Pest control operators in North Carolina have taken the first steps toward forming a state wide association.

Meeting during the recent PCO School held at North Carolina State College, February 20, 21, operators designated an organizational committee of five. Heading the committee is W. J. Killough of the Killo Exterminating Co., Raleigh, temporary chairman, with John Young of Orkin Exterminating Co., Durham, as temporary secretary.

Another meeting is to be called within the coming months, to ratify the Constitution and By-laws and elect officers. Interested North Carolina PCOs are urged to attend this meeting and become charter members. John Young, temporary secretary, welcomes questions on the new organization, and can be contacted by writing Box 1589, Durham, North Carolina.

Guest speaker at the PCO School banquet was William O. Buettner, executive secretary of the National PCO Association, who said the major credit for the school's success went to Professor Clyde F. Smith, who devoted so much of his time toward its organization.

Dykstra Warns Tenn. PCA

"Mice are not the insignificant creatures we formerly thought them to be," warned Walter W. Dykstra at a February 13 meeting of the Tennessee Pest Control Association (West Tennessee Division), in Memphis.

Dykstra, of the U. S. Fish and Wildlife Service, spoke chiefly on various poisons and baits effective against mice, particularly recommending Warfarin. But, he maintained, poisons are only temporary curbs, and "sanitation is the biggest club we can use." (He also exploded the myth that cheese is universally a good bait, pointing out that peanut butter or rolled oats were effective baits, and that sometimes a mere wad of cotton on the trap would do the trick.

Five important factors about the house mouse should be remembered, Dykstra continued, in approaching an understanding of control problems:

1. It can adapt itself to almost any living condition.

2. It possesses a limited home range — no more than 10 to 25 feet.

3. Gives 30 to 57 off-spring a year and can bear young at 3 months.

4. Is a light, intermittent feeder, eating perhaps 20 times in 24 hours.

5. Lives in closer proximity to man than any other animal, and while not generally a disease breeder, can carry organisms which cause food poisoning.

After surveying sections of the city of Memphis, Dykstra told his audience, which included several county health officials, that "Memphis is one of the cleanest cities, if not the cleanest, that I've ever seen."

Touching briefly on civilian defense problems, Dykstra felt that pest control operators would play an important role "if our cities were subjected to a bombing attack. The build-up of the rat and mouse population would become a problem."

Walter B. Hill, Tennessee PCA president, told members that the association had already offered its services to state and city civilian defense councils, and that a close program of cooperation was being worked out in the event of enemy attack.

Woods Picked By St. Louis PCA

Tom Woods, Woods System Vermin Control, has been chosen 1951 president of the St. Louis Pest Control Association.

Introduced at St. Louis PCA's annual banquet, February 3, Woods was followed by newly-elected Henry Sherman, East Side Exterminating Co., vice-president, and James M. McDonald, Shaw Service Co., secretary-treasurer.

Both J. Edwin Sameth and William O. Buettner, NPCA president and executive secretary respectively, spoke before banquet guests.

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You never have that "jammed-in" feeling, wearing the ACME Full - Vision Gas Mask. Its patented, larger lenses are like picture windows, giving you full natural vision for that safe, unconfined feeling. When you walk, you can actually see your toes without bobbing your head. This factor alone makes Acme outstanding among gas masks . . . well worth looking into.

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Keep Pigeons, Starlings and Other Birds from Buildings

7½ lbs., 75c lb. 25 lbs., 65c lb. 100 lbs., 60c lb.

PEST CONTROL CHEMICALS CO.

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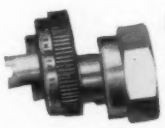
TeeJet tools for better, faster residual spraying

To make residual spraying with **TeeJet** Spray Nozzles easier and faster, Spraying Systems offers a wide range of related equipment such as strainers, extensions, and connectors. The Trigger **TeeJet** assembly above is one example of accessory equipment available. The Trigger **TeeJet** Valve is quality built, with positive shut-off and lever lock-catch for easy open operation. Extensions are supplied straight or curved in lengths up to 48".



MulTeeJet TIP ASSEMBLY

Here is a handy nozzle assembly that provides four different sprays in one nozzle assembly. The head of the nozzle rotates and indexes to four positions . . . each position giving a different spray. The MulTeeJet Tip Assembly fits the Trigger Valve or will fit any connection used for **TeeJet** Nozzles.

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SPRAY NOZZLES

WRITE FOR BULLETIN 58
for complete information on **TeeJet** Spray Nozzles and related equipment for residual spraying.

PESTALES

What About Fly-Power?

Our crack London correspondent, A. Pffeuffnig, has come up with the following newsy item: One John M. Smith, a graduate student in biology at the University of London, has constructed a machine which measures a house fly's horse-power.

Pffeuffnig himself was one of the select few invited to attend the first demonstration of the device. He reports the fly, perched on a flat aluminum platform, vigorously flapped its wings to the tune of only one-millionth of a horsepower. This action confirmed inventor Smith's vaguest suspicions. He now maintains the fly uses only 1 to 2% of its energy potential, and has arrived at the astounding conclusion that the fly is a worthless creature. (PCOs know different!)

Mr. Smith's findings are highly significant, for they reassure us of the vast difference between the efficiency of man and that of the lowly fly.

* * *

U. N. Denies Mice Attack Human Rights

Field mice have not invaded the United Nations Headquarters Building in New York.

Earlier reports maintained that field mice were scampering about the 30th floor of the 39-story building, frightening woman employees and nibbling on files of the Human Rights Division.

But bewildered officials stated that no substantiation could be found for such a claim.

It's comforting to know they're keeping a file on human rights anyway.

* * *

Position Wanted:

The following ad recently appeared in the classified section of a mid-western newspaper: Lovely kitten desires position as companion to little girl. Will also do light mouse work.

What is competition coming to?

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Agency: Florence Majers, Inc.

Loyalty Oath Proposed

(from page 28)

the bill is as follows:

"I, ..., do solemnly swear (or affirm) that I will support and defend the Constitution of the United States and the Constitution of the State of California against all enemies, foreign and domestic; that I will bear true faith and allegiance to the Constitution of the United States and the Constitution of the State of California; that I take this obligation freely, without any mental reservation or purpose of evasion; and that I will well and faithfully discharge the duties upon which I am about to enter.

"And I do further swear (or affirm) that I do not advocate, nor am I a member of any party or organization, political or otherwise, that now advocates the overthrow of the Government of the United States or of the State of California by force or violence or other unlawful means; that within the five years immediately preceding the taking of this oath (or affirmation) I have not been a member of any party or organization, political or otherwise, that advocated the overthrow of the Government of the United States or of the State of California by force or violence or other unlawful means except as follows: (If no affiliations, write in the words 'No Exceptions') and that during such time as I hold a license or permit issued by the (name of department, bureau, or agency) I will not advocate nor become a member of any party or organization, political or otherwise, that advocates the overthrow of the Government of the United States or the State of California by force or violence or other unlawful means."

Hoffman New Okla. PCA Head

C. A. Hoffman, Tulsa, Oklahoma, has been elected 1951 president of the Oklahoma Pest Control Operator's Association.

Meeting at the pest control short course, held at Oklahoma A. & M. University, Stillwater, Oklahoma, February 1-3, members also named Tom Graham, Oklahoma City, vice-president, and John O'Connor, Oklahoma City, secretary-treasurer.

Announcing

the

MAY

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of

PEST CONTROL

magazine

If you sell pest control chemicals and supplies that can be used in any phase of community pest control — **this is the issue** to advertise in. Men responsible for community insect and rodent control programs will read your advertisement in the May number.

because of
these Feature Articles

1. **Indianapolis Is Solving Its Rodent Control Problem**
   by Jay Hundley, Indianapolis Rodent Control Supervisor
2. **Community and Location Fly Control**
   by J. H. Coffey, U.S. Public Health Sanitary Engineer
3. **Syracuse's PCO Ordinance**
   by Dr. C. A. Sargent, Syracuse, N. Y. Commissioner of Health
4. **Plus all the other regular features**
   found in each issue

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SUPERIOR CHLORDANE FORMULATIONS

LUCIDE A-20, a true colloidal emulsion of refined grade chlordane. 1 Part Lucide A-20 plus 9 parts of water equals 10 parts 2% Chlordane Emulsion.

LUCIDE S-60, a water miscible oil containing 60.3% refined grade chlordane. 1 Part Lucide S-60 plus 39 parts of water equals 40 parts of 2% Chlordane Emulsion.

Lower concentrates as well as ready-to-use insecticides, all of permanent stability, may be made from either of these formulations by the simple addition of water. They are ideal to repackage for over-the-counter sales.

STABLE IN HARD WATER, TOO!

On the job they have longer lasting residual effect in areas subjected to wetting. Ready to use products made from these concentrates do not require agitation. They give you the same formulation from top to bottom, are completely fire-proof. They will not clog nor harm brass or stainless steel spraying equipment.

LUCIDE A-20

Is for the PCO who wants to carry lower concentrates to the job and merely add water to get an extremely stable ready to use insecticide. Lucide A-20 is the easiest of all concentrates to use.

55 GAL. LINED DRUMS
$3.45 PER GAL.

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$3.95 PER GAL.

1 GAL. GLASS BOTTLE
$5.45 PER GAL.

All prices F. O. B. N. Y. C.

LUCIDE S-60

Is for the PCO who wants a high concentrate to save money in shipping and space in storing. It makes lower concentrates, or ready-to-use insecticides. It keeps indefinitely in original shipping containers.

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1 GAL. GLASS JARS
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